

YAMAHA®

**AUTHORIZED
PRODUCT MANUAL**

SPX990

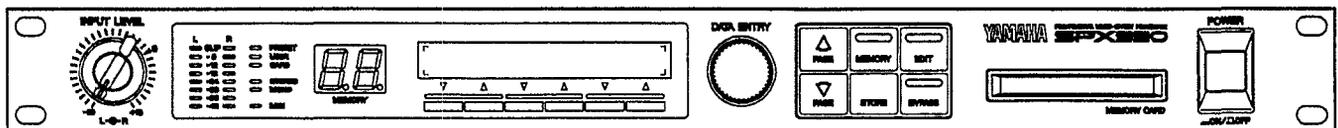
Professional Multi-effect Processor

YAMAHA

SPX990

Professional Multi-effect Processor

Operation Manual



FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

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

2. IMPORTANT:

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

3. NOTE:

This product has been tested and found to comply with the requirements listed in FCC Regulations. Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

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

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

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

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA 90620
The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

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* Dies bezieht sich nur auf die von der Yamaha Corporation of America vertriebenen Produkte.

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* Esto se aplica solamente a productos distribuidos por Yamaha Corporation of America.

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

WARNING : THIS APPARATUS MUST BE EARTHED

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

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

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

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

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

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

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CANADA

THIS DIGITAL APPARATUS DOES NOT EXCEED THE "CLASS B" LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE LA "CLASSE B" PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

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Dette apparat overholder det gældende EF-direktiv vedrørende radiostøj.

Cet appareil est conforme aux prescriptions de la directive communautaire 87/308/CEE.

Diese Geräte entsprechen der EG-Richtlinie 82/499/EWG und/oder 87/308/EWG.

This product complies with the radio frequency interference requirements of the Council Directive 82/499/EEC and/or 87/308/EEC.

Questo apparecchio è conforme al D.M.13 aprile 1989 (Direttiva CEE/87/308) sulla soppressione dei radiodisturbi.

Este producto está de acuerdo con los requisitos sobre interferencias de radio frecuencia fijados por el Consejo Directivo 87/308/CEE.

SPECIAL FEATURES OF SPX990

- has 20 bits A/D and D/A conversion which provide high grade sound.
- equipped with pre and post-effects in the high quality Multi-effect system.
- installed with the memory card, XLR-tap and footswitch systems
- provided convenient operations through function key, data entry dial and has a big LCD display.

Congratulations on your acquisition of a Yamaha Professional sophisticated digital reverberation and effect systems which offers 80 preset effect programs including accurate simultaneous of natural reverberation and early reflections, delay and echo effects, gated effects, a versatile compressor, delay harmonic driver, multiple effects, freeze (sampling) programs which can do loop playback and others. Epoch-making new effect like the main effect programs include multi-tap delay which can determine each level of time and balance, the round pan and intelligent pitch which can add harmony through internal recording on specific keys and scale. The temp, stereo echo and temp, quad echo also add new attractive effects to the SPX990. With a sampling frequency of 44.1kHz, it delivers full, flat frequency response from 20Hz to 20kHz for exceptionally clean, "transparent" effect sound and direct digital interfacing capability making it compatible with the most up-to-date sound system. The preset effect programs can be edited, re-titled and stored in any of the 80 RAM memory locations. Individual 3-band parametric EQ and dynamic filter parameters are provided for each effect program for precise tonal tailoring. In addition to the basic effect and EQ parameters, the SPX990 offers a list of "internal parameters" which provide exacting control over the effect sound. The SPX990 is also MIDI compatible, with a MIDI IN terminal that allows MIDI selection of effect programs and a switchable MIDI THRU/OUT terminal. When switched to OUT, edited programs stored in the internal RAM can be dumped to a MIDI data recorder or other data storage devices. Programs thus stored can be reloaded when necessary via the MIDI IN terminal. As an extra touch of convenience, the SPX990's analog input and output terminals can be switched to match -20dBm or +4dBm line levels, providing compatibility with a broader range of sound equipment. Convenient external data storage is provided by a card slot that accepts optional RAM cards that can be used to store effect programs. In order to fully take advantage of all the capability offered by the SPX990 Professional Multi-effect Processor, we urge you to read this operation manual thoroughly while trying out fully the many features and effects provided by the SPX990.

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PRECAUTIONS

1. AVOID EXCESSIVE HEAT, HUMIDITY, DUST AND VIBRATION

Keep the unit away from locations where it is likely to be exposed to high or low temperature - such as near sun exposure places, stove, etc. Also avoid locations which are subject to excessive dust accumulation or vibration which could cause mechanical damage.

2. AVOID PHYSICAL SHOCK

Strong physical shocks to the unit can cause damage. Handle with care.

3. DO NOT OPEN THE CASE OR ATTEMPT REPAIRS OR MODIFICATIONS YOURSELF

This unit contains no user-serviceable parts. Refer all maintenance to qualified Yamaha service personnel. Opening the case and/or tampering with the internal circuitry will void the warranty.

4. MAKE SURE POWER IS OFF BEFORE MAKING OR REMOVING CONNECTION

Always turn the power OFF prior to connecting or disconnecting cables. This is important to prevent damage to the unit itself as well as other connected equipment.

5. HANDLE CABLES CAREFULLY

Always plug and unplug cables- including the AC cord- by gripping the connector, not the cord.

6. CLEAN WITH A SOFT DRY CLOTH

Never use solvents such as benzine or thinner to clean or aerosol spray to spray the unit. Wipe clean with a soft, dry cloth.

7. ALWAYS USE THE CORRECT POWER SUPPLY

Make sure that the power supply voltage specified on the rear panel matches your local AC main supply.

8. THUNDER STRIKE

Disconnect the unit quickly when there is any lightning striking in your area.

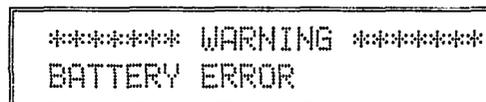
9. ELECTRICAL INTERFERENCE

Since the unit contains digital circuitry, it may cause interference and noise if placed too close to TV sets, radios or similar equipment. If such a problem does occur, move the unit further away from the affected equipment.

10. MEMORY BACKUP

The SPX990 contains a special long-life battery that retains the contents of its internal RAM memory even when the power is turned OFF. The backup battery should last approximately 5 years. When the battery voltage drops to a level that is too low to maintain the memory contents, the following message will appear on the unit display when the power is turned ON.

It is recommended that as a back-up system you should save the data into the memory card or store the data into external devices for MIDI bulk out (you cannot save data into the memory card for Program Change Table and System Data).



If this display appears, have the backup memory replaced by a qualified Yamaha service personnel. Do not attempt to do it yourself.

NOTE: The preset program will not to erased even if the battery voltage drops.

11. STORAGE

After reading this operation manual, please keep it and the warranty in a safe place for future reference.

12. ERROR NUMBER

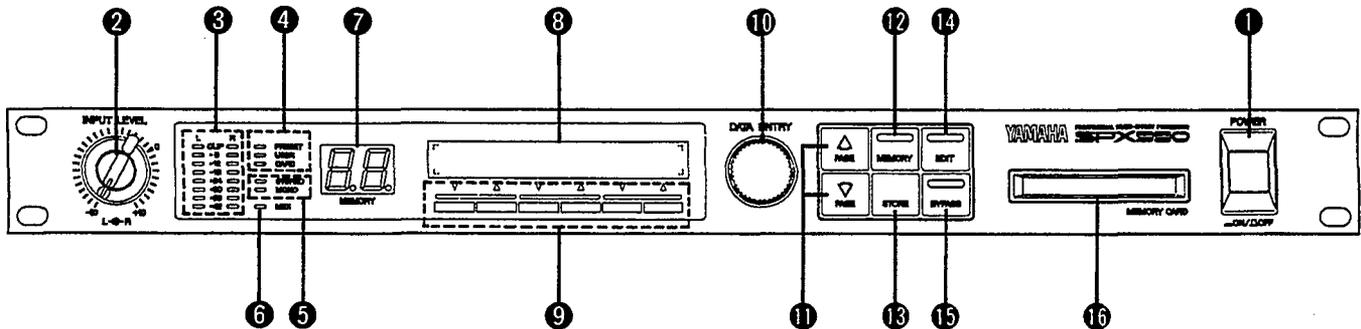
When the SPX990 power is initially turned ON, a self-diagnostic program runs automatically to check a number of important operational parameters. If a problem is detected, an error number E1 through E4 will appear on the MEMORY No. display. If the error numbers appears, please take the SPX990 to your nearest Yamaha dealer for servicing, and be sure to tell the service personnel which error number was displayed.

System Initializing

When you press the PAGE Select ∇ key, STORE key and BYPASS key at the same time, the system will be initialized with power supply ON. Please take note that the stored user memory will return to original setting.

CONTROLS AND CONNECTIONS

THE FRONT PANEL



1 Power Switch

Press to turn the power ON, press to turn the power OFF. When the power is turned ON, the last program and parameter selected will be automatically recalled.

2 Input Level Controls

These concentric controls vary the input levels of the analog inputs. The inner control adjusts the Lch level and the outer control the Rch level.

3 Input Level Meter

The stereo input level meter consists of eight Lch and Rch segments per channel, corresponding to -42dB, -36dB, -30dB, -24dB, -18dB, -12dB, -6dB and Clip input.

4 Memory Area Indicator

The memory area have 3 indicators to be selected: PRESET, USER and CARD.

5 Input Select Indicator

The two input selections: STEREO or MONO can be chosen on the indicator (refer to page 9 for Input Select Indicator)

6 MIDI Indicator

The indicator will light up whenever a MIDI signal is inputted in the MIDI IN terminal.

7 LED MEMORY No. Display

When the LED display is continuously lit, the effect corresponding to the number displayed is active. When the LED display is flashing, this indicates a new memory location has been selected but has not been recall, leaving the previously selected effect active. When the recalling and storing are activated, it will light up.

8 LCD Display

The LCD displays the title of a selected effect, parameter value, messages, etc.

9 Assignable Function ∇ and \blacktriangle Keys

The keys allow one touch direction to direct recall, activate selected effects and make parameter selection easy for edit mode. Press the keys to change the LCD display.

10 Data Entry Dial

The dial allows the change in program memory No. or parameter values.

11 Page Select \triangle and ∇ Keys

The \triangle and ∇ keys allow step-wise selection of the menu numbers. Press the key corresponding to the direction in which you want increment or decrement.

12 Memory Mode Key and Indicator

This key is used to select a new memory location mode. The indicator will light up when the key is pressed. The key can also be used to select the indicator from the memory area.

13 Store Key

This key is used to store edited effect programs into one of the user memory location or the memory card by simply pressing the store key. (For program storage, refer to page 16.)

14 Edit Key and Indicator

Press this key to get the edit mode. When the edit mode is activated, the indicator will light up.

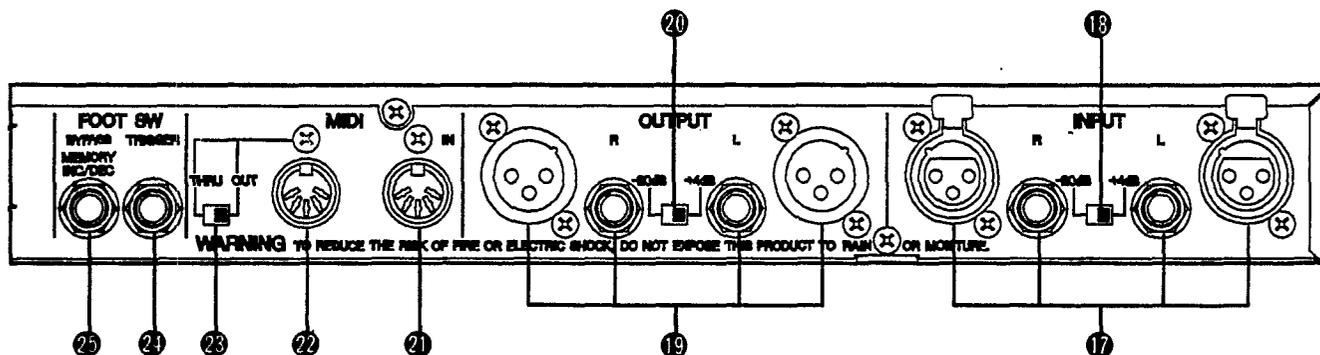
15 Bypass Key and Indicator

When the key is pressed, all unit effects are completely bypassed and the input signal is fed directly to the output. During bypassing, the indicator will light up.

16 Memory Card Slot

Optional memory card can be inserted in here to provide more locations.

THE REAR PANEL



17 L & R Input Connectors

These are the analog stereo inputs to the SPX990. The XLR-3-31 type connector and TRS phone jacks are both electrical balanced input connectors. Refer to "SELECTING AN INPUT MODE" on page 9 when connecting to monaural output jacks.

18 Input Level Switch (+4dB/-20dB)

The level switch selects either -20dB or +4dB nominal input level.

19 L & R Output Connectors

These are the analog stereo output to the SPX990. The XLR-3-32 type connector and TRS phone jacks are both electrical balanced output connectors.

20 Output Level Switch (+4dB/-20dB)

The switch selects either the -20dB or the +4dB nominal output level.

21 MIDI IN Terminal

This terminal is used to receive the MIDI signals from external MIDI devices.

22 MIDI OUT/THRU Terminals

23 OUT/THRU Switch

Selects either MIDI THRU or MIDI OUT operation for the MIDI OUT/THRU connector, described below.

MIDI OUT

When the switch controlling MIDI terminal is set at MIDI OUT, the internal data are fed to an external MIDI data recorder for storage.

MIDI THRU

When the switch is set at MIDI THRU, the terminal simply re-transmit data received at the MIDI IN terminal, allowing daisy-chaining to other MIDI devices.

24 Trigger Footswitch Jack

The footswitch jack can set parameters in a program and trigger effect programs. The footswitch jack accepts an optional Yamaha equivalent connector FC4 or FC5 for foot-controlled triggering of any effect program.

25 Bypass or INC/DEC Footswitch Jack

The following functions can be used to change the setting of the edit mode.

Bypass Function

When the optional footswitch FC4 or FC5 is connected to the jack, it can be used as the same function as in Bypass Key in 15 on the front panel.

Memory INC/DEC Function

When an optional footswitch FC4 or FC5 is connected to the jack, it can be used as a foot control to change program.

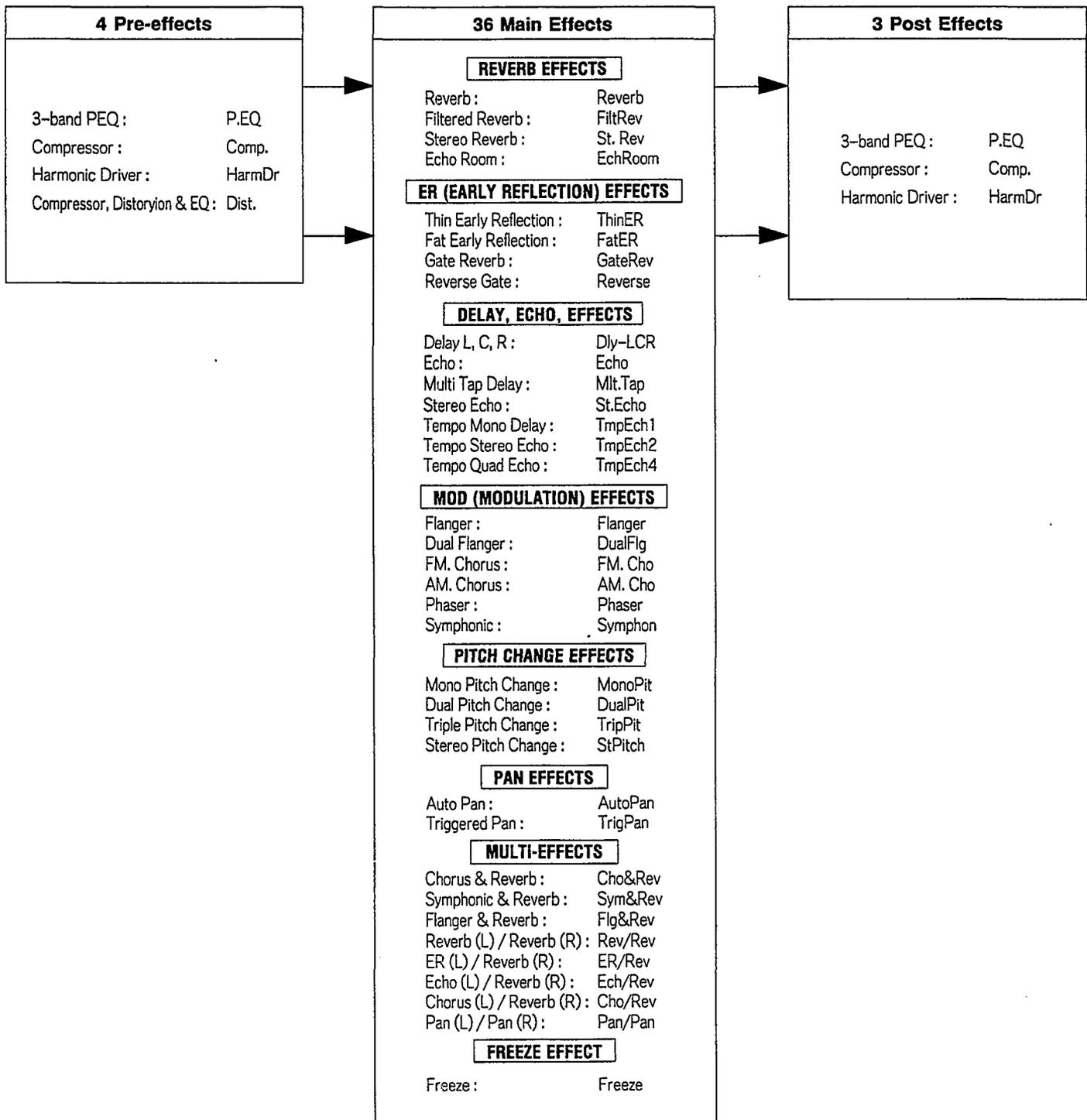
THE SPX990 SYSTEM

EFFECT CONFIGURATION

The SPX990 allows access to three separate groups of effect programs - pre-effect, main effect and post-effect.

It has 36 main effects, 4 pre-effects and 3 post-effects to select on. The pre and post-effects are equalizing and dynamic controls which play a role in the main effects.

These internal memory locations parameters provide flexibility in many ways we could enjoy.



MEMORY CONFIGURATION

In the SPX990, there are three memory areas in which a total of 280 programs can be fed into or recalled.

Preset Memory: No. 1-80 = 80 types

The preset memory contains 80 effect programs. (See page 12 for "Preset Program List") that you can select and use without modification. The preset programs themselves cannot be erased or changed in any way, but they can be edited and stored in the USER or CARD memory to create original variation.

User Memory : No. 1-99, 00 =100 types

The user memory provides 100 locations in which your own effect creations can be stored. You can edit a preset effect to create an original variation. At the time of purchase, storing of program is the same as that of the pre-set program.

Card Memory: No. 1-99,00=100 types

An optional memory card can be used to increase the memory locations or create a program library. The memory card can be used to edit and store a program just like the user memory locations and all the programs in the user memory locations can also be stored in the memory card.

MEMORY CARD

An optional Yamaha memory card MCD-32 or MCD-64 can hold up to 100 effects each to increase the memory storage of the programs. The card can store the user memory location programs or transfer its programs to the user memory.

Caution when using the memory card

- When you use the memory card for the first time, be sure to format it first. (See page 18)
- Do not pull out the card during recalling (see page 10), storing (see page 16), saving (see page 18) or loading (see page 18) of program. Also, do not pull out the card when the memory area indicator shows "CARD".
- The memory card cannot be stored or saved a program when the write protect switch is set at "ON". Also, the memory card cannot be loaded once the user memory protect is set at "ON". (See page 17)
- When operating a memory card, messages below will appear on the LCD.
 - ① When there is no memory card, "No Memory Card" will appear.
 - ② During write protecting, "Write Protect" will appear.
 - ③ When cards which cannot be used in the SPX990 are inserted or when cards are not initialized, "Wrong ID Card" will appear.

MEMORY & EDIT MODES

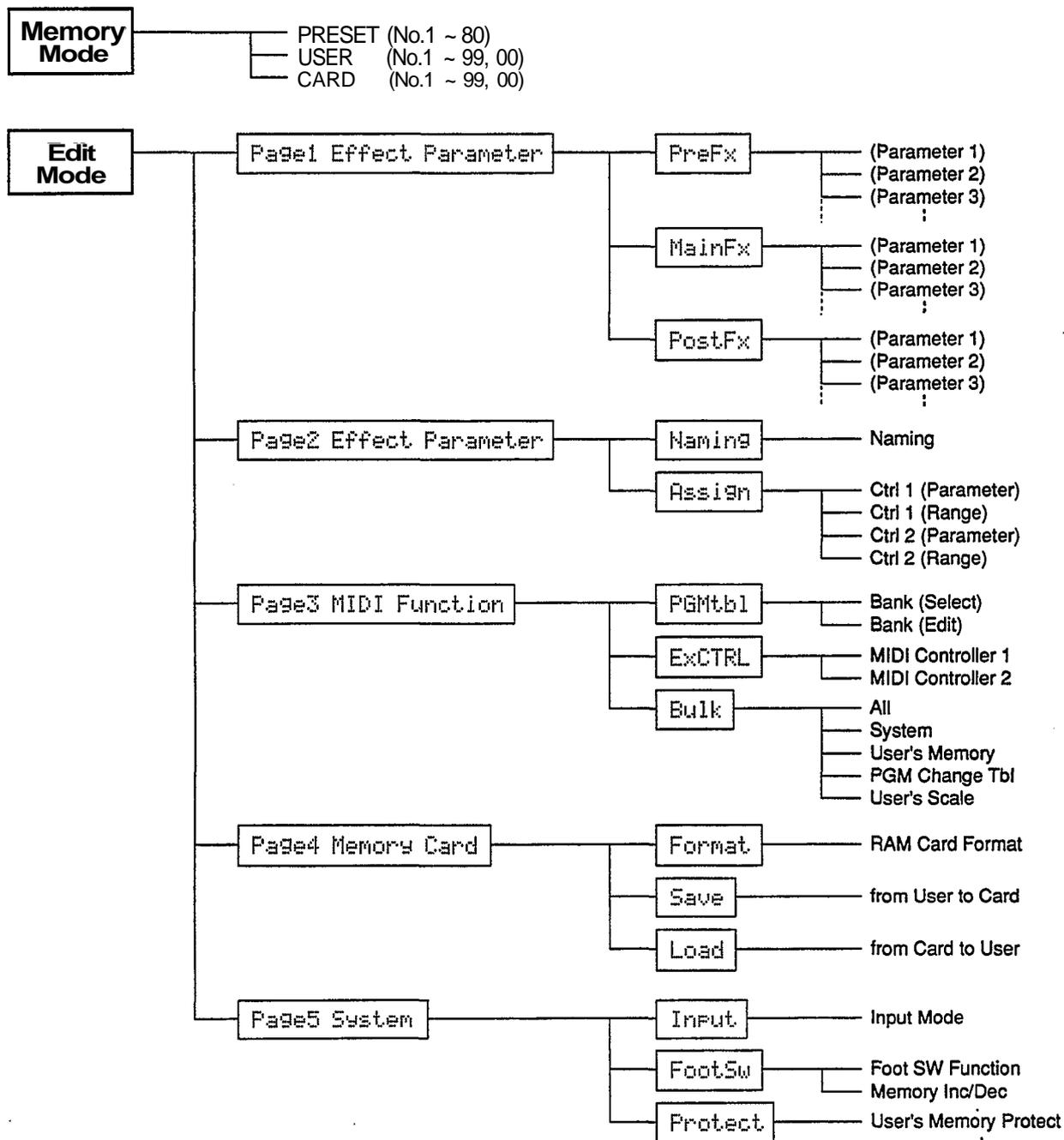
There are two types of modes in this unit:

Memory Mode

This mode makes use of the effect program to recall that program. (see page 10). This mode normally appears when the power switch is ON.

Edit Mode

This mode set or edit the effect parameters. Press the EDIT key to get this mode. There are 5 menu pages to this mode. For selection of pages, press the PAGE Select Δ and ∇ keys.



NOTE: When storing an effect program, press the STORE key and the memory mode will return, (page 16)

NOTE: If you want to get back to the memory mode from the edit mode, press the MEMORY key.

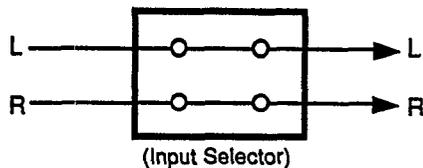
SELECTING AN INPUT MODE (Edit Mode: Page 5 menu)

We should try to understand input mode selection even though the preset effect program can be edited and stored.

The SPX990 inputs are stereo input connectors. However, signal from the left jack can be fed to both left and right channel processing circuitry and similarly, the signal from the right jack can be passed to the left and right channel processing circuitry.

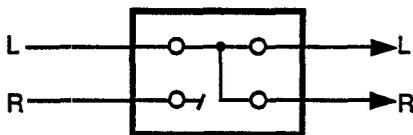
Stereo

This is the normal mode of operation in which left- and right-channel signals received at the left- and right-channel inputs are passed on to the SPX990 processing circuitry on the same channels as which they were received.



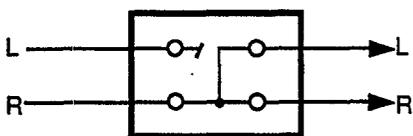
L Mono

This and the R Mono mode described below are ideal for use with monaural input and stereo inputs signal. In the L Mono mode, a monaural signal received at the INPUT L jack is fed to both the left- and right-channel processing circuitry and signal received at the INPUT R is ignored.



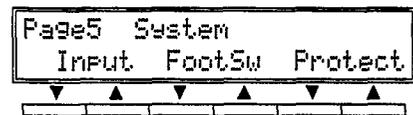
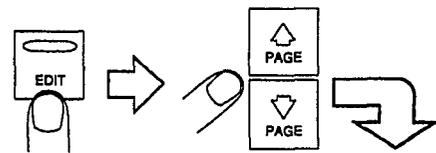
R Mono

A monaural signal received at the INPUT R jack is fed to both the left- and right-channel processing circuitry and signal received at the INPUT L is ignored.

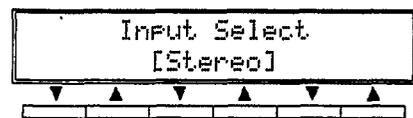
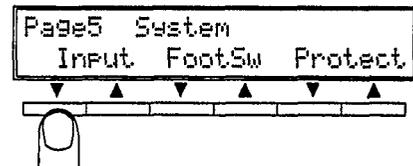


How to select an input mode

- ① Press the EDIT key to get the edit mode. Then use the PAGE Select Δ and ∇ keys to select Page5 of edit mode on the LCD display.



- ② Press any function ∇ or Δ key under the LCD display "Input" to get the "Input Select" display.



- ③ Press any function ∇ or Δ key under the LCD display "Input Select" to select the input mode (Stereo, L Mono or R Mono).



NOTE: When you select the input mode to be "L Mono" signal or "R Mono" signal even when connecting both the L and R terminals, monaural input signals will be transmitted.

NOTE: Input select mode is the same for all programs so they are stored even if the power switch is OFF,

- ④ Press the EDIT key if you want to return to the Page1 of edit mode or press the MEMORY key to return to the memory mode.

GENERAL OPERATION

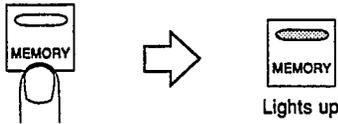
MEMORY RECALL

There are 3 methods to recall a program;

1. Recall by panel key standard method.
2. Direct recall..... recall by simply pressing the function ▼ and ▲ keys.
3. MIDI program change..... recall by external MIDI devices.(see page 52)

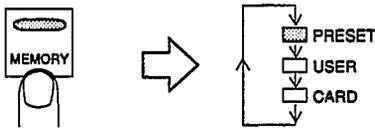
1. How to recall a program by panel key

- ① Press the MEMORY key to get the memory mode function.
The memory indicator will light up.

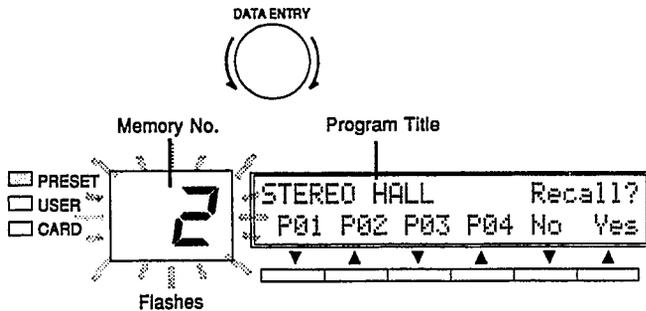


- ② Press the MEMORY key to select the desired "PRESET", "USER" or "CARD" you want from the memory area.

NOTE: Be sure to set the memory card in the card slot first before recalling any program from the memory area.

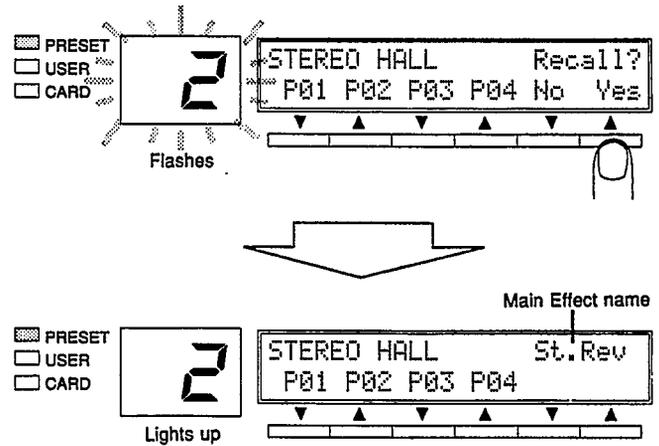


- ③ Turn the DATA ENTRY dial to select the desired program memory No. The selected memory No. will flash on the display. The selected program title will be displayed on the LCD but actually, this is the previous program.



- ④ Press the function ▲ key under the LCD "Yes" and the memory No. indication will light up and the program will be recalled. After recalling the program, the name of the main effect program will appear on the right side of the LCD.

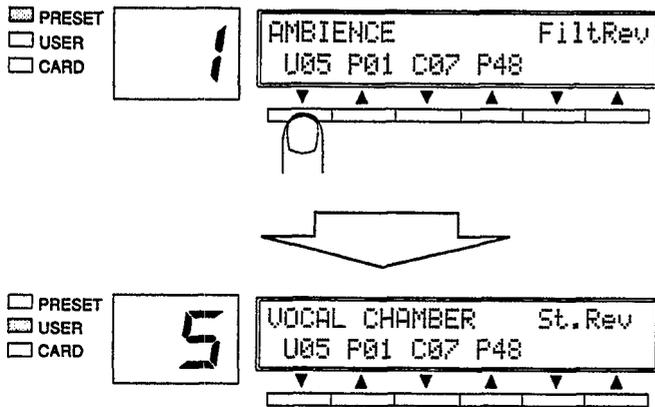
Press the function ▼ key under "No" in the LCD if you want to cancel the recalling and the previous selected program will appear.



2. Direct Recall

Recalling can be done on any memory area program by simply pressing the function ▼ and ▲ keys if the direct recall function is been used.

The preset program No.1 can be recalled in the example below. However, by pressing the extreme left function key, the user memory No.5 (U05) program can also be recalled.



That is to say, the direct recalling takes one action to do three steps from ②-④ in the "1. How to recall a program by panel key".

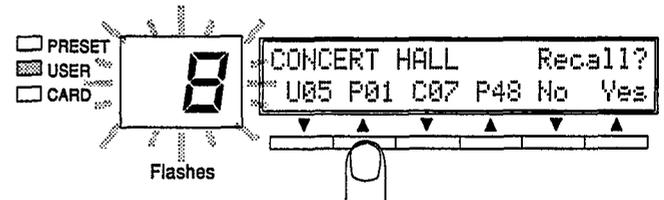
In order to do direct recalling, four function ▼ and ▲ keys from the left can be used. The four keys can be used for selection of any memory location. All stored program in any memory location will be saved even if the power switch is OFF.

NOTE: Direct recall can be used when a mode is at the memory mode function. Press the MEMORY key when a mode is at other mode function. (MEMORY indicator will light up)

NOTE: When doing direct recall from the memory card, insert the card into the slot first before pressing the function key. "No Memory Card" will appear if there is no memory card in the slot and programs cannot be recalled.

How to enter a memory No. for direct recall function

- ① Do the operations from steps ①-③ in "1. How to recall a program by panel key" for recalling the desired program.
- ② When the memory No. flashes on the display, press the function key under the program No. you want to recall.



- ③ The desired memory No. will light up on the LCD display and the desired program No. on top of the pressed function key is recalled.



The letter in front of each two digits refers to:
P: PRESET, U: USER and C: CARD.

- ④ Other programs can also be done with other function keys in the same way.

PRESET PROGRAM LIST

MEMORY NO.	PROGRAM NAME	EFFECT			GOOD FOR
		PreFx	MainFx	PostFx	
LONG REVERBS					
1	AMBIENCE	P.EQ	FiltRev	off	All
2	STEREO HALL	off	St.Rev	off	E. Piano, Vocal
3	DRUM CHAMBER	P.EQ	ER/Rev	off	ER for Tom / REV for Snare
4	PLATE HALL	off	Rev/Rev	off	PLATE for Vocal, HALL for Inst.
5	VOCAL CHAMBER	off	St.Rev	Comp.	Vocal
6	BRIGHT HALL	off	FiltRev	off	All
7	BREATHY REVERB	P.EQ	FiltRev	HarmDr	Male Vocal, Keyboard
8	CONCERT HALL	off	Reverb	off	Keyboard (Pad)
9	REVERB FLANGE	off	Flg&Rev	P.EQ	All
MEDIUM REVERBS					
10	VOCAL PLATE	P.EQ	Reverb	P.EQ	Vocal, All
11	ECHO ROOM	off	EchRoom	off	All
12	PRESENCE REVERB	off	FiltRev	P.EQ	Brass, Woodwind
13	SNARE PLATE	off	FiltRev	off	Snare, Drums, Percussion
14	ARENA	off	Reverb	off	Drums
15	THIN PLATE	off	St.Rev	P.EQ	Vocal
16	OLD PLATE	P.EQ	FiltRev	off	Snare
ROOMS					
17	FAT REFLECTIONS	P.EQ	FatER	Comp.	Drums, Percussion
18	WOOD ROOM	off	EchRoom	HarmDr	Drums, Percussion
19	BIG SNARE	off	GateRev	off	Snare
20	BRIGHT SNARE	P.EQ	FiltRev	Comp.	Snare
21	SQUASH ROOM	P.EQ	EchRoom	Comp.	Rock Drums, Guitar
22	BAMBOO ROOM	off	EchRoom	off	Percussion
23	REFLECTIONS	off	ThinER	P.EQ	All
24	STONE ROOM	off	FiltRev	P.EQ	All
25	CONCRETE ROOM	off	GateRev	off	Metal Guitar
GATED REVERBS					
26	BLATTY PLATE	P.EQ	FiltRev	P.EQ	Drums
27	FULL METAL GATE	P.EQ	GateRev	P.EQ	Drums
28	HARD GATE	P.EQ	GateRev	Comp.	Snare
29	REVERSE GATE	P.EQ	Reverse	Comp.	Guitar Solo, Vocal
30	REVERSE PURPLE	off	Reverse	P.EQ	Drums
DRUM MACHINE REVERBS					
31	DRUM MACH. AMB.S	off	St.Rev	P.EQ	Hi-hat, Snare
32	DRUM MACH. AMB.L	off	FiltRev	off	Percussion, Snare
33	ELECT.SNR PLATE	P.EQ	Reverse	Comp.	Snare
DALAYS					
34	SYNC DELAY	off	TmpEch4	off	Rock Vocal
35	VOICE DOUBLER	off	DualPit	off	Vocal
36	DELAY L, C, R	off	Dly-LCR	off	All
37	120 BPM PAN DDL	off	TmpEch2	off	Vocal, Hi-hat < ♩ = 120 >
38	120 BPM MONO DLY	off	TmpEch1	off	Vocal < ♩ = 120 >
39	MULTI TAP DELAY	off	MltTap	P.EQ	Vocal
40	KARAOKE ECHO	off	StEcho	P.EQ	Karaoke Vocal

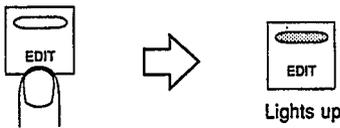
MEMORY NO.	PROGRAM NAME	EFFECT			GOOD FOR
		PreFx	MainFx	PostFx	
PITCH EFFECTS					
41	GOOD OL P.CHANGE	off	DualPit	off	All
42	VOCAL SHIFT	Comp.	DualPit	off	Vocal, Backings
43	AIRY PITCH	HarmDr	DualPit	P.EQ	Vocal
44	ANALOGUE SLAP	HarmDr	DualPit	P.EQ	Vocal
45	FAT BASS	P.EQ	TripPit	off	Synth Bass
46	"LOW" SNARE	P.EQ	DualPit	P.EQ	Snare, Drums
47	HALO COMB	HarmDr	DualPit	Comp.	Drums
48	GRUMPY FLUTTER	HarmDr	DualPit	P.EQ	<Desending Pitch Effect>
49	ROGER ON THE 12	off	MonoPit	off	Guitar
50	TWISTER	off	DualPit	HarmDr	Percussion
51	BOTTOM WHACKER	P.EQ	DualPit	off	Drums
52	INTELLICHORD MON	off	MonoPit	off	Guitar, Vocal <Input mono tone>
53	INTELLICHORD DUA	off	DualPit	off	Guitar, Vocal <Input mono tone>
54	INTELLICHORD TRI	off	TripPit	off	Guitar, Vocal <Input mono tone>
55	PITCH SLAP	HarmDr	DualPit	off	Vocal
56	STEREO PITCH	off	StPitch	off	Vocal <Key shift>
MODULATION EFFECTS					
57	SYMPHONIC	off	Symphon	off	Guitar, Keyboard
58	GTR SYM ECHO	HarmDr	Sym&Rev	P.EQ	Guitar, Keyboard
59	CHORUS & REVERB	off	Cho&Rev	off	Guitar, Keyboard
60	BASS CHORUS	off	DualPit	off	Bass
61	STEREO PHASING	off	Phaser	off	Guitar
62	CLASSY GLASSY	HarmDr	FM.Cho	P.EQ	Keyboard (Pad)
63	SILKY SWEEP	HarmDr	Phaser	P.EQ	All
64	DETUNE CHORUS	off	DualFlg	off	All
65	UP DOWN FLANGE	P.EQ	Flanger	P.EQ	Guitar
66	UNDERWATER MOON	P.EQ	Cho/Rev	HarmDr	Keyboard (Pad), guitar
67	TREMOLO	off	AutoPan	off	Guitar, Keyboard
68	ROTARY SP.	Dist.	AM.Cho	off	Keyboard (Organ)
PROCESSING EFFECTS					
69	FREEZE	off	Freeze	off	Sampling
70	DIST. PERCUSSION	Dist.	ThinER	Comp.	Percussion
71	DISTORTION 1	Dist.	ThinER	Comp.	Bass, Vocal
72	PAN	off	AutoPan	off	All
73	TRIGGERED PAN	off	TrigPan	off	All
74	PAN / PAN	off	Pan/Pan	off	Keyboard
SOUND EFFECTS					
75	ON THE PHONE	P.EQ	Echo	Comp.	Telephone Voice
76	IRON MAN	P.EQ	Dly-LCR	Comp.	Robot Voice
77	RADIO BLAG	P.EQ	Flanger	off	Radio Sound
78	TUNNEL	off	EchRoom	P.EQ	Tunnel Reverb
79	FOREVERVERB	off	St. Rev	off	Very Long Reverb
80	SILVERHEART	P.EQ	Ech/Rev	HarmDr	Echo with Lots of Regeneration

EDITING AN EFFECT PARAMETER MODE (Edit Mode: Page 1 menu)

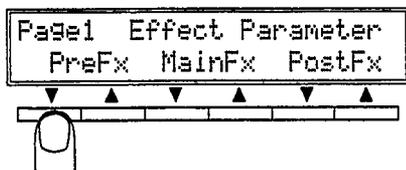
Every program has different changeable parameters available in each effect. Original programs can be created by varying the parameters. The number of parameters and its type may be different to create an effect but the procedure for editing of a program is the same.

The procedure for editing parameters

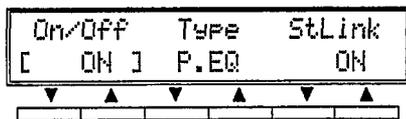
- ① Select and recall a desired program to be edited, (refer to "Memory Recall" on page 10)
- ② Press the EDIT key to get the edit mode. The edit indicator will light up.
- ③ Press the PAGE Select Δ and ∇ keys to get the Page1 of the edit mode.



- ④ Press any function ∇ or \blacktriangle key under the desired effect on the LCD display and the effect parameter to be edited will appear on Page 1. Page 1 shows each effect setting of PreFx, MainFx and PostFx. (refer to "Selecting an Effect" on page 20)

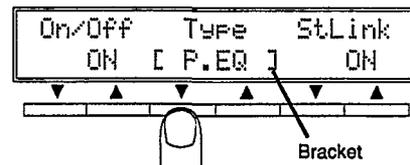


Page1 of the effect parameter



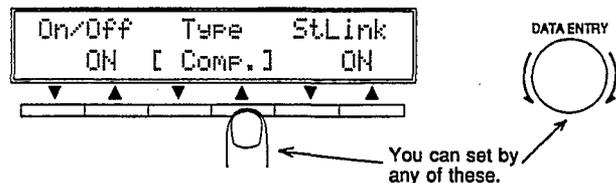
- ⑤ The top line in the LCD display shows the parameter title and the bottom line shows each of its data.

Press any function ∇ or \blacktriangle key under the parameter to be edited to change the data. The bracket will move according to the place where the function key is pressed.



- ⑥ The parameter data can be changed by either the function ∇ or \blacktriangle keys or by the DATA ENTRY dial.

NOTE: The parameter data changes very fast or slow depending on the speed of turning the DATA ENTRY dial.



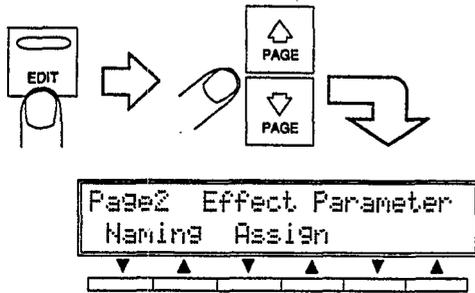
- ⑦ Press the PAGE Select Δ and ∇ keys and the menu screen to be edited will appear. Edit the parameter data from ⑤ to ⑥. The number of parameters and its variation are different to create an effect, (refer to "THE PROGRAMS & PARAMETERS" on page 20)
- ⑧ Press the EDIT key if you want to return to the edit mode on Page1. Other effect parameters can also be edited if necessary.
- ⑨ The edited parameters data will not be lost even if the power switch is OFF but other programs not stored will be lost if the preset program is recalled. To store an edited data, you have to store the data into the user memory, (see page 16)
- ⑩ Press the MEMORY key to get back the memory mode again.

TITLE EDITING (Edit Mode: Page 2 menu)

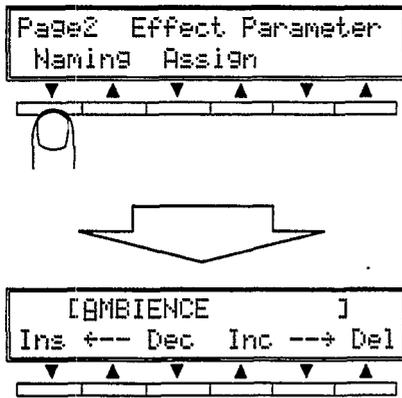
You can title an effect program or change the original title (max. 16 letters) of an effect program that is edited by using the dial or the function ▼ and ▲ keys.

The procedure for naming a program

- ① Select and recall a desired program to be edited, (refer to "Memory Recall" on page 10)
- ② Press the EDIT key to get the edit mode and use the PAGE Select ▲ and ▼ keys to display the Page2 of the edit mode

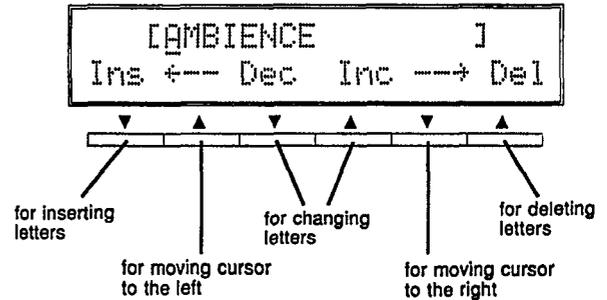


- ③ Press any function ▼ or ▲ key under the display "Naming" which is on the bottom line of the LCD display to get the menu screen.



- ④ Shift the cursor on the top left line on the LCD by using the function ▼ and ▲ keys which are at the bottom of the "←" "→" position to select the letters. Letters can be changed by using the function ▼ and ▲ keys at the bottom of "Dec" and "Inc" or by using the DATA ENTRY dial.

The letters runs in sequence as shown below. Press the function ▼ key under "Ins" to insert any letter and press the function ▲ key under "Del" to delete any letter.



■ The available letters are shown in sequence below.

	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		[]	<	>	:	.	*	+	-	=	&	/	,	.
'	%	!	?	→	←	[]	.	.	-	ア	ァ	ィ	ィ	ウ	ウ	
エ	エ	オ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ	タ	チ	ツ	テ
ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ	ミ	ム	メ	モ	ヤ	ャ
ユ	ユ	ヨ	ヨ	ラ	リ	ル	レ	ロ	ワ	ヲ	ン		#	0	1	2	3
4	5	6	7	8	9												

- ⑤ Store the effect program, (see page 16 for "STORING PROGRAM")

STORING A PROGRAM

You can store original programs with changed parameters after recalling the programs from the three memory locations (preset, user and card) into the user memory location or the memory card. Also, you can choose the desired program to be used in the three selections in the memory area and store in the user memory location or the memory card.

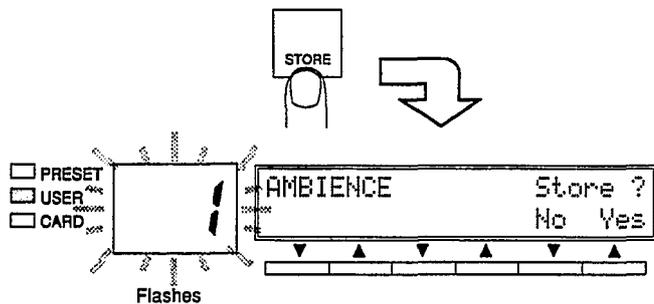
How to store a program

- ① Set the user memory protect at OFF before storing a program. (refer to "SELECTING USER MEMORY PROTECT on page 17")

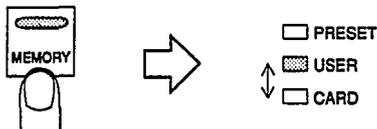
NOTE: You do not have to do this operation if the user memory protect mode is set at OFF.

NOTE: If the User memory protect is still ON after having stored a program, the STORE key been pressed by mistake, will not activate the storing.

- ② If you want to store a desired program other than the one which is presently recalled, you can recall that desired program for storing.
- ③ Press the STORE key to execute "Store" mode.



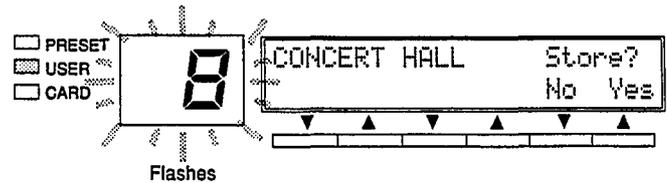
- ④ Press the MEMORY key to select USER or CARD from the memory area location.



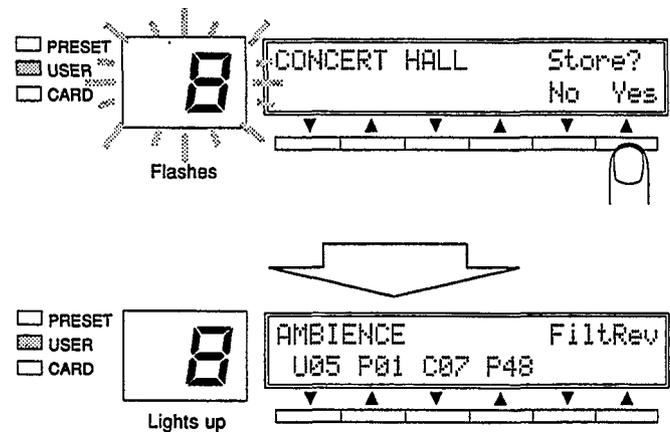
NOTE: When storing an edited program in the memory card, set the WRITE PROTECT switch at OFF first. Then, insert the card into the card slot before selecting the memory location, "CARD".

NOTE: You cannot store edited programs into the PRESET memory area location.

- ⑤ Turn the DATA ENTRY dial to change and select the memory No. to be stored. The memory No. indicator will flash and the title of the program stored previously will appear on the LCD.



- ⑥ Press the function ▲ key under the display "Yes" or the STORE key once again and the program stored previously will change to the desired program. The memory No. indicator will light up. Then the desired program recalled will be stored.



If you want to cancel any storing effect, press the function ▼ key under the display "No".

NOTE: The previous edited program stored will be lost if a new edited program with the same memory No. is been stored.

NOTE: You can do title editing on the new program, (refer to "TITLE EDITING" on page 15)

NOTE: You can store any parameter data regardless of the setting at ON/OFF for BYPASS mode.

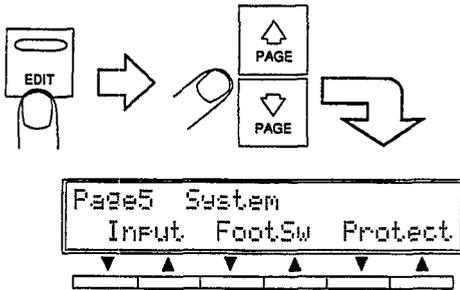
NOTE: You can load all data in the memory card into the user memory location or load all data from the user memory location into the memory card. (refer to "SETTING OF MEMORY CARD on page 18")

SELECTING USER MEMORY PROTECT (Edit Mode: Page 5 menu)

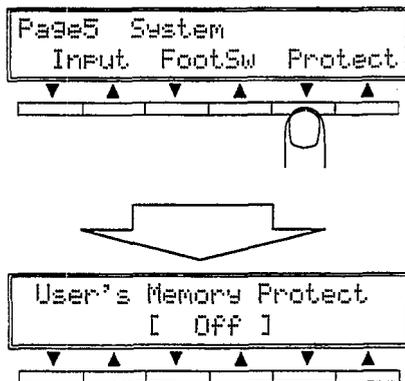
You cannot store any edited data in the user memory location if the user memory protect is set at $\square H$. Pressing the STORE key by mistake will not activate the storing effect.

The procedure for user memory protect mode

- ① Press the EDIT key to get the edit mode. Then use the PAGE Select \blacktriangle and \blacktriangledown keys to display the Page5 of the edit mode.



- ② Press the any function \blacktriangledown or \blacktriangle key at the bottom the LCD with "Protect," to display the "User's Memory Protect".



- ③ Select "ON" or "OFF" by using the function \blacktriangledown and \blacktriangle keys under the bracket display [].
- ④ Press the EDIT key if you want to return to the Page1 of edit mode or press the MEMORY key to return to the memory mode.

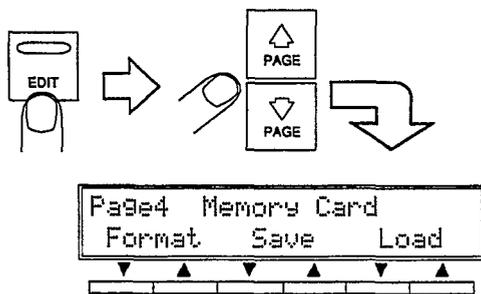
SETTING OF MEMORY CARD (Edit Mode: Page 4 menu)

The following steps show how to use a memory card:

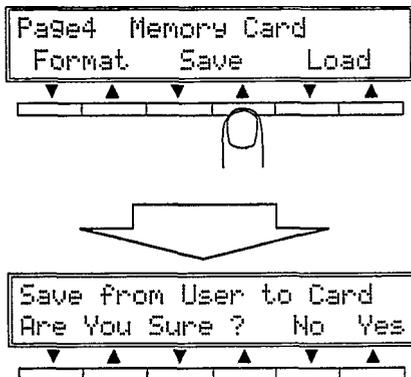
- FormatFormat the MCD-64 or the MCD-32 memory card.
- Save.....Copy and save all user memory data into the memory card.
- Load.....Copy and load all memory card data into the user memory.

How to set a memory card

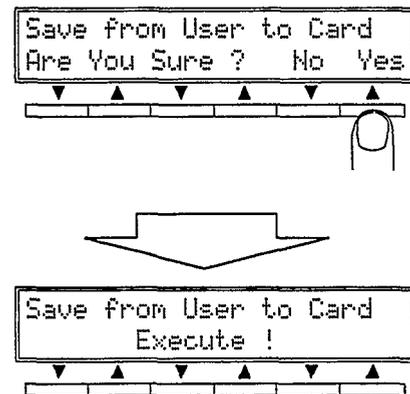
- ① Insert the MCD-64 or MCD-32 memory card well into the memory card slot.
- ② Press the EDIT key to get the edit mode. Then press the PAGE Select Δ and ∇ keys to display the Page4 of the edit mode.



- ③ "Format", "Save" and "Load" are indicated on the bottom line of the LCD. Press any function ∇ or Δ key at the bottom of any desired operation to display the next screen.



- ④ Press the function Δ key under the display "Yes" and the following operation will appear.



Press the function ∇ key under the display "No" if you want to cancel the operation.

- ⑤ Press the EDIT key if you want to return to the Page1 of edit mode or press the MEMORY key to return to the memory mode.

NOTE: If you do formatting, the data stored in the memory now will be lost.

NOTE: If you do formatting and saving procedure, be sure to turn off the write protect switch in the memory card first. After you have done formatting and saving procedure, turn on the write protect switch.

SELECTING A FOOT SWITCH (BYPASS, INC/DEC TERMINAL) (Edit Mode: Page 5 menu)

The BYPASS, INC/DEC terminal in the rear panel can be connected to Yamaha's optional foot switch FC4 or FC5 and the following selection can be done:

- **BYPASS function**

This function serves the same operation as the BYPASS key on the front panel.

- **Memory INC/DEC function**

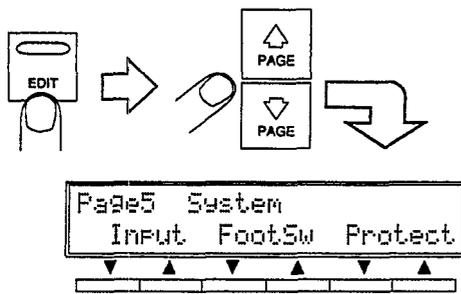
A selected program can be recalled within a certain range by using the foot switch.

Every time the foot switch is been pressed on, a program will be changed.

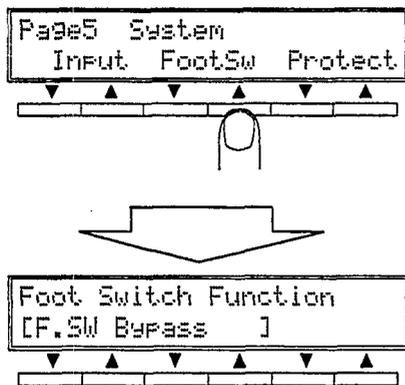
NOTE: During performance, it will be very convenient if you can store the selected programs in sequence in the user memory or in the memory card.

How to operate the foot switch

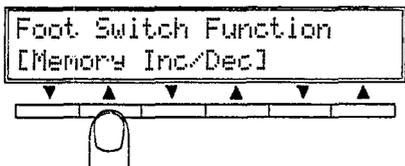
- ① Press the EDIT key to get the edit mode. Then press the PAGE Select Δ and ∇ keys to display the Page5 of the edit menu.



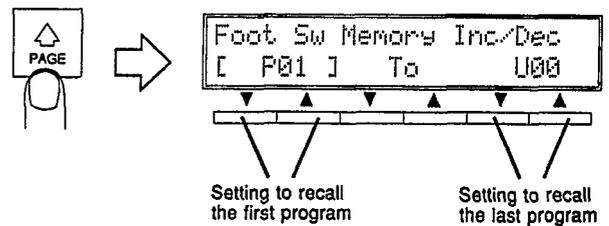
- ② Press any function ∇ or \blacktriangle key under the display "FootSw" to get to the foot switch function menu screen.



- ③ Press any function ∇ or \blacktriangle key on the left under the display to select either "Memory Inc/Dec" or "Bypass" function.



- ④ If you select the "Memory Inc/Dec" function, press the PAGE Select Δ key to get to the next menu screen.

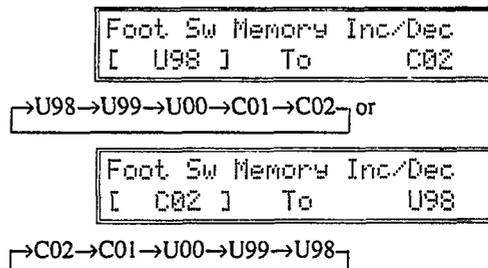


- ⑤ Set the first program to be recalled by the left function keys. Then when you press the footswitch once the program set will be recalled. The memory No. is in two digits and the letter in front of the digits refers to P: PRESET, U: USER and C: CARD.
- ⑥ Set the last program to be recalled by the right two function ∇ and \blacktriangle keys. Then when you press the footswitch to the last program set, it will be recalled.
- ⑦ Press the EDIT key if you want to return to the Page1 of edit mode or press the MEMORY key to return to the memory mode.

In this operation, the program is automatically stored even if you do not press the STORE key.

- **An example of a recalling range**

Each program is changed in order of



THE PROGRAMS & PARAMETERS

In the SPX990, original programs can be created by editing the preset program. Therefore, it is important that we understand each and every preset program fundamentally in order to make full use of the effects.

Those parameters which have ★ mark cannot be controlled by MIDI parameter, (refer to page 56)

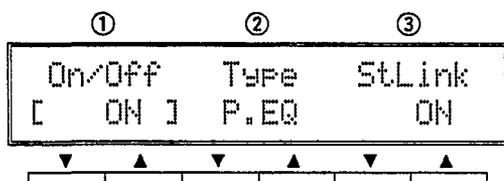
SELECTING AN EFFECT

As explained in the earlier section, one program is made up of 3 effects: pre-effect, main effect and the post effect.

There are together 4 kinds pre-effects, 36 kinds of main effects and 3 kinds of post effects.

Selecting an effect can be done on Page 1 of the edit mode. (refer to "EDITING AN EFFECT PARAMETER MODE" on page 14.)

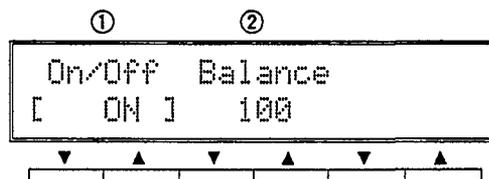
● PreFx, PostFx



- ① On/Off (Effect On/Off: ON, OFF)
This is the setting of the on/off function of the pre-/post effect.
- ② Type (Effect Type: P.EQ, Comp., HarmDr, Dist.)
The following types of effects can be selected.
NOTE: Dist. effect cannot be selected in the post effect.
NOTE: Refer to "PRE & POST EFFECT PARAMETERS" for explanation on the effects.
- ③ StLink (Stereo Link: ON, OFF)
This is the On/Off function of the stereo link of Lch and Rch. When the function is set at ON, a channel's parameter value will be changed and set. At the same time another channel's parameter same value will also be set. In the case of the "Comp." effect, the compression parameters will be activated and both right and left channels stereo link will be done when the function is set at ON.
NOTE: There is no StLink parameter for the "Dist." effect.

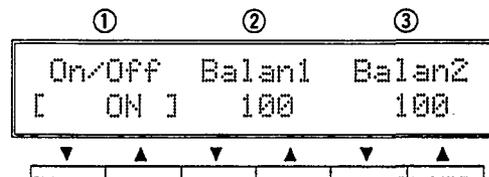
● MainFx

NOTE: You cannot choose the main effects in the edit mode. Therefore, edit the desired effect program to make a original program.



- ① On/Off (Main Effect On/Off: ON, OFF)
This is the setting of on/off function of the main effect.
- ② Balance (Mix Balance: 0% ~ 100%)
This parameter adjusts the balance between the direct sound and effect signals. At 0%, only the direct sound is delivered from the SPX990 output while at 100%, only the effect sound is output.

Under the several effects, there are two types of effects having balance parameters.



- ① On/Off (Main Effect On/Off: ON/OFF)
This is the setting of the on/off function of the main effects.
- ② Balan 1 (Type 1 Mix Balance: 0% ~ 100%)
- ③ Balan 2 (Type 2 Mix Balance: 0% ~100%)
These parameters adjust balance between the direct sound and Type 1 effect sound (② Balan 1) and direct sound and Type 2 effectsound (③ Balan 2).

NOTE: Please refer to Type 1 and Type 2 effect sounds for explanation.

PRE & POST EFFECT PARAMETERS

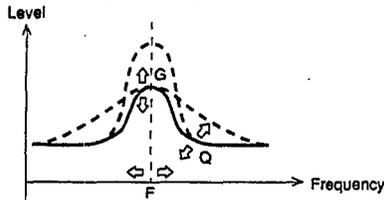
The following are four kinds of pre and post effects:

- P. EQ..... Parametric Equalizer
- Comp..... Compressor
- HarmDr Harmonic Driver
- Dist..... Compressor, Distortion & Equalizer (only for pre-effect)

Name of effect	(LCD display)	in/out
3-band Parametric Equalizer (P. EQ)		2in/out

This is the parametric equalizer of the stereo IN/OUT function. The effect of the 3-band parametric equalizer can be set on the left and right channels separately.

- ① L.LoF (Lch Low Frequency: 40Hz ~ 1.0kHz)
The parameter determines the center frequency of boost or cut for the Lch low frequency equalizer band.



- ② L.LoG (Lch Low Gain: -15dB ~ +15dB)
The parameter determines the amount of boost or cut applied to the Lch low frequency equalizer band.

- ③ L.LoQ (Lch Low Q: 0.1 ~ 10.0)
The parameter determines the peak sharpness of the Lch low frequency equalizer.

- ④ R.LoF (Rch Low Frequency: 40Hz ~ 1.0kHz)
⑤ R.LoG (Rch Low Gain: -15dB ~ +15dB)
⑥ R.LoQ (Rch Low Q: 0.1 ~ 10.0)
④, ⑤ and ⑥ are the parameters of the Rch same as ①, ② and ③ of the Lch.

- ⑦ L.MiF (Lch Mid Frequency : 250Hz~4.0kHz)
The parameter determines the center frequency of boost or cut for the Lch mid frequency equalizer band.

- ⑧ L.MiG (Lch Mid Gain: -15dB - +15dB)
The parameters determines the amount of boost or cut applied to the Lch mid frequency equalizer band.

- ⑨ L.MiQ(Lch Mid Q: 0.1 ~ 10.0)
The parameter determines the peak sharpness of the Lch mid frequency equalizer.

- ⑩ R.MiF (Rch Mid Frequency: 250Hz ~ 4.0kHz)
⑪ R.MiG (Rch Mid Gain: -15dB ~ +15dB)
⑫ R.MiQ (Rch Mid Q: 0.1 ~ 10.0)
⑩, ⑪ and ⑫ are the parameters of the Rch same as ⑦, ⑧ and ⑨ of the Lch.

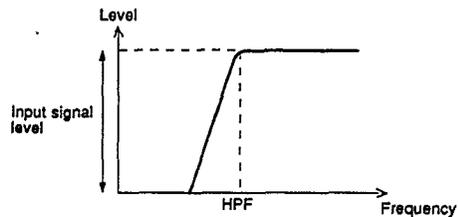
- ⑬ L.HiF (Lch High Frequency: 1.0kHz ~ 16kHz)
The parameter determines the center frequency of boost or cut for the Lch high frequency equalizer band.

- ⑭ L.HiG (Lch High Gain; -15dB ~ +15dB)
The parameter determines the amount of boost or cut applied to the Lch high frequency equalizer band.

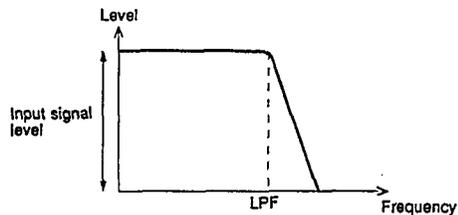
- ⑮ L.HiQ (Lch High Q: 0.1 ~ 10.0)
The parameter determines the peak sharpness of the Lch high frequency equalizer.

- ⑯ R.HiF (Rch High Frequency: 1.0kHz ~ 16kHz)
⑰ R.HiG (Rch High Gain: -15dB ~ +15dB)
⑱ R.HiQ (Rch High Q: 0.1 ~ 10.0)
⑯, ⑰ and ⑱ are the parameters of the Rch same as ⑬, ⑭ and ⑮ of the Lch.

- ⑲ L.HPF (Lch HPF Frequency: THRU, 20Hz ~ 1.0kHz)
Determines the Lch high pass filter's cut-off frequency. A frequency lower than the determined one will be cut off at 12db/oct.



- ⑳ L.LPF (Lch LPF Frequency: 1.0kHz ~ 16kHz, THRU)
Determines the Lch low pass filter's cut off frequency. A frequency higher than the determined one will be cut-off at 12dB/oct.



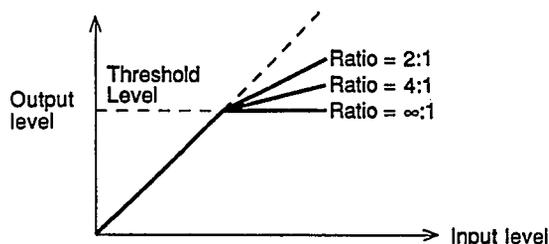
- ㉑ L.Lvl (Lch Output Level: -∞, -30dB ~ +6dB)
The parameter sets the level of the Main FX or output level from the Lch.

- ㉒ R.HPF (Rch HPF Frequency: THRU, 20Hz ~ 1.0kHz)
㉓ R.LPF (Rch LPF Frequency: 1.0kHz ~ 16kHz, THRU)
㉔ R.Lvl (Rch Output Level: ∞, -30dB ~ +6dB)
㉒, ㉓ and ㉔ are the parameters of the Rch same as ⑲, ⑳ and ㉑ of the Lch.

Compressor (Comp.)

2in/2out

This is the compressor of the stereo IN/OUT function. When a signal above the set level is inputted, that level will be reduced and outputted. It is possible to reduce the signal peak completely to eliminate the distortion, to average the touching effect when performing and to raise the volume overall. When compressing the compressor to gain the dynamic range, a small volume of noise can be heard. In order to lessen this noise, a noise gate is installed in this program. The parameters can be set separately in the Lch and Rch.



① LThrs (Lch Threshold Level: -24 ~ +12)

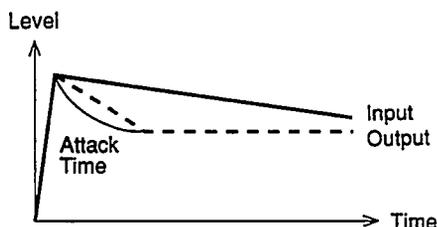
When sound signal is inputted into the Lch is higher than the set signal by the parameter, the sound will be reduced. The smaller the value, the smaller the sound will be reduced and there will be no level difference.

② LRatio (Lch Ratio: 2:1, 3:1, 4:1, 6:1, 8:1, ∞:1)

This is the ratio of the sound input into Lch and reduced sound. The nearer the value is to ∞:1, the smaller the sound can be reduced.

③ LAtck (Lch Attack Time: 1.0 ~ 20)

This is the time when the sound to be reduced starts in the Lch (inputted sound level exceeds the Thresh level) until the time it reaches the ratio of compression set in ②. The shorter the time, the more rapid is the reduction. If the time is long, the attack will remain creating a peculiar sound.



④ LRele (Lch Release Time: 0.01 ~ 2.0)

If the inputted sound level is smaller than the Thresh level, the reduced sound level will become the level of performance sound which is not reduced. This is the time when it takes to return to original level.

⑤ L. Gate (Lch Noise Gate Level: 0 ~ 20)

The signal cannot pass through the noise gate below a certain set signal level. Noise will be cut when there is no signal. The bigger the level is, the more the signal will be cut.

⑥ L.Lvl (Lch Output Level: -∞, -30dB ~ +24dB)

The parameter sets level of the Main FX or the output level of the Lch output.

⑦ R.Thrs (Rch Threshold Level: -24 ~ +12)

⑧ R.Ratio (Rch Ratio: 2:1, 3:1, 4:1, 6:1, 8:1, ∞:1)

⑨ R.Atck (Rch Attack Time: 1.0 ~ 20)

⑩ R.Rele (Rch Release Time: 0.01 ~ 2.0)

⑪ R.Gate (Rch Noise Gate Level: 0.01 ~ 20)

⑫ R.Lvl (Rch Output Level: -∞, -30dB ~ +24dB)

⑦ ~ ⑫ are the parameters of the Rch same as ① ~ ⑥ of the Lch.

Harmonic Driver (HarmDr)

2in/2out

This is the IN/OUT harmonic driver of the stereo. This driver increases the harmonic overtone over a certain frequency and creates a clear sound.

Parameters can be set separately in both the Lch and Rch.

① L.Freq (Lch Frequency: 400Hz ~ 10kHz)

Indicates the cut-off frequency of the Lch's high pass filter. The harmonic overtone over a set frequency can be added.

② L.Driv (Lch Drive Level: 0 ~ 100)

Indicates the level of harmonic overtone added to Lch. The harmonic overtone can be added only to a cut-off frequency higher than L.Freq. The bigger the parameter's value, the clearer is the sound.

③ L.Mix (Lch Mixing Level: 0 ~ 100)

The parameter adjusts the balance of the sound volume in Lch between the fundamental tone and effect tone. At 50%, the fundamental and effect tone are delivered from the output. At 0%, only the fundamental tone is delivered from the output.

④ R.Freq (Rch Frequency: 400Hz ~ 10kHz)

⑤ R.Driv (Rch Drive Level: 0 ~ 100)

⑥ R.Mix (Rch Mixing Level: 0 ~ 100)

④, ⑤ and ⑥ are the parameters of the Rch same as ①, ② and ③ of the Lch.

⑦ L.Lvl (Lch Output Level: -∞, -30dB ~ +6dB)

The parameter sets the level of MainFX or the output level of the Lch.

⑧ R.Lvl (Rch Output Level: -∞, -30dB ~ +6dB)

The parameter sets the level of MainFX or the output level of the Rch.

Compressor, Distortion & EQ (Dist.)**1 in/1out**

This is the program connecting the compressor, distortion and 2-band parametric equalizer respectively. Since it is an monaural IN/OUT program, the Lch input and Rch input are mixed and effected. Then they are assigned to the Lch and Rch output separately.

① CmpTyp (Compressor Type: Off, Compr., Limit)

Choice of types of compressor.

Compr. : compress the dynamic range to average the sound effect.

Limit. : simply compress the peak limit to avoid distortion.

Off : OFF the compressor.

② Sustain (Sustain: 0 ~ 100)

Only sets the sustaining of sound. The bigger the value, the longer is the sound effect.

③ Attack (Attack Time: 1.0 ~ 20)

The attack time sets the strength of the input signal attack.

The smaller the value, the shorter is the attack. If you want to heighten the attack during the picking of the guitar, etc., set the value bigger so that even if you pick hard on the guitar, attack can be added to each sound effect.

④ CmpLvl (Compressor Level: -∞, -30dB ~ +12db)

The parameter sets the output level to the distortion.

⑤ DstTyp (Dist. Type: Dist. 1 ~ Crunch)

Choose the distortion type.

Dist. 1 : Typical distortion sound

Dist. 2 : Fusion, solo mellow distortion sound.

Ovdr. 1 : Typical over-drive sound

Ovdr. 2 : Vacuum tube amplifier sound-alike over-driver.

Crunch : Produces crunch sound

⑥ Drive (Drive: 0 - 100)

Sets the strength of the distortion. The bigger the value, the more distorted the drive is.

⑦ Tone (Tone: -30 ~ +30)

Sets the sound quality of the distortion. The bigger the value, the more the distortion is in the high frequency and the smaller the value, the more the distortion is cut off in the high frequency.

⑧ N.Gate (Noise Gate Level: 0 ~ 20)

The signal set below a certain level will not be passed.

This parameter provides the convenience by cutting any noise when there is no signal. The bigger the value, the bigger the signal will be cut.

⑨ DstLvl (Dist. Level: -∞, -30dB ~ +6dB)

Sets the output level to the 2-band parametric equalizer.

⑩ LowLvl (Low Level: 0 ~ 100)

Determines the quantity of boost of a low frequency equalizer. The bigger the value, the more the low frequency can be emphasized.

⑪ LowFrq (Low Frequency: 50Hz ~ 1 kHz)

Determines the center frequency of a low frequency equalizer.

⑫ LowQ (Low Q: 0.2 ~ 2.0)

Determines the peak sharpness of the low frequency equalizer. The bigger the value, the more the frequency set in ⑩ LowFrq can be emphasized.

⑬ HigLvl (High Level: 0 ~ 100)**⑭ HigFrq (High Frequency: 400Hz ~ 10kHz)****⑮ HigQ (High Q: 0.2 ~ 2.0)**

Sets the high frequency equalizer. (Refer to ⑩ ⑪ and ⑫)

PROGRAM MAIN EFFECT PARAMETERS

This section includes brief descriptions of each of the SPX990 basic effect as well as descriptions of the parameters available in each effect. In the earlier parts, we have explained about pre and post - effect parameters and now, we will devote ourselves to the main effect parameters.

There are 80 preset memory programs in the SPX990.

The main effect parameters are divided into several groups of programs:

REVERB PROGRAMS

- Reverb (Reverb)
 - 8. CONCERT HALL
 - 10. VOCAL PLATE
 - 14. ARENA
- Filtered Reverb (FiltRev)
 - 1. AMBIENCE
 - 6. BRIGHT HALL
 - 7. BREATHY REVERB
 - 12. PRESENCE REVERB
 - 13. SNARE PLATE
 - 16. OLD PLATE
 - 20. BRIGHT SNARE
 - 24. STONE ROOM
 - 26. BLATTY PLATE
 - 32. DRUMMACH.AMB.L
- Stereo Reverb (St.Rev)
 - 2. STEREO HALL
 - 5. VOCAL CHAMBER
 - 15. THIN PLATE
 - 31. DRUM MACH. AMB.S
 - 79. FOREVERVERB
- Echo Room (EchRoom)
 - 11. ECHO ROOM
 - 18. WOOD ROOM
 - 21. SQUASH ROOM
 - 22. BAMBOO ROOM
 - 78. TUNNEL

ER (EARLY REFLECTION) PROGRAMS

- Thin Early Reflection (ThinER)
 - 23. REFLECTIONS
 - 70. DIST. PERCUSSION
 - 71. DISTORTION 1
- Fat Early Reflection (FatER)
 - 17. FAT REFLECTIONS
- Gate Reverb (GateRev)
 - 19. BIG SNARE
 - 25. CONCRETE ROOM
 - 27. FULL METAL GATE
 - 28. HARD GATE
- Reverse Gate (Reverse)
 - 29. REVERSE GATE
 - 30. REVERSE PURPLE
 - 33. ELECT.SNR PLATE

DELAY, ECHO PROGRAMS

- Delay L, C, R (Dly-LCR)
 - 36. DELAY L,C,R
 - 76. IRON MAN
- Echo (Echo)
 - 75. ON THE PHONE
- Multi Tap Delay (Mlt.Tap)
 - 39. MULTI TAP DELAY
- Stereo Echo (StEcho)
 - 40. KARAOKE ECHO
- Tempo Mono Delay (TmpEch1)
 - 38. 120 BPM MONO DLY
- Tempo Stereo Echo (TmpEch2)
 - 37. 120 BPM PAN DDL
- Tempo Quad Echo (TmpEch4)
 - 34. SYNC DELAY

MOD (MODULATION) PROGRAMS

- Flanger (Flanger)
 - 65. UP DOWN FLANGE
 - 77. RADIO BLAG
- Dual Flanger (DualFlg)
 - 64. DETUNE CHORUS
- FM. Chorus (FM.Cho)
 - 62. CLASSY GLASSY
- AM. Chorus (AM.Cho)
 - 68. ROTARY SP.
- Phaser (Phaser)
 - 61. STEREO PHASING
 - 63. SILKY SWEEP
- Symphonic (Symphon)
 - 57. SYMPHONIC

PITCH CHANGE PROGRAMS

- Mono Pitch Change (MonoPit)
 - 49. ROGER ON THE 12
 - 52. INTELICHORD MON
- Dual Pitch Change (Dual Pit)
 - 35. VOICE DOUBLER
 - 41. GOODOLP.CHANGE
 - 42. VOCAL SHIFT
 - 43. AIRY PITCH
 - 44. ANALOGUE SLAP
 - 46. "LOW" SNARE

- 47. HALO COMB
- 48. GRUMPY FLUTTER
- 50. TWISTER
- 51. BOTTOM WHACKER
- 53. INTELICHORD DUA
- 55. PITCH SLAP
- 60. BASS CHORUS
- Triple Pitch Change (TripPit)
 - 45. FAT BASS
 - 54. INTELICHORD TRI
- Stereo Pitch Change (StPitch)
 - 56. STEREO PITCH

PAN PROGRAMS

- Auto Pan (Auto Pan)
 - 67. TREMOLO
 - 72. PAN
- Triggered Pan (TrigPan)
 - 73. TRIGGERED PAN

MULTI-EFFECT PROGRAMS

- Chorus & Reverb (Cho&Rev)
 - 59. CHORUS & REVERB
- Symphonic & Reverb (Sym&Rev)
 - 58. GTRSYMECHO
- Flanger & Reverb (Flg&Rev)
 - 9. REVERB FLANGE
- Reverb (L) / Reverb (R) (Rev/Rev)
 - 4. PLATE HALL
- ER (L) / Reverb (R) (ER/Rev)
 - 3. DRUM CHAMBER
- Echo (L) / Reverb (R) (Ech/Rev)
 - 80. SILVERHEART
- Chorus (L) / Reverb (R) (Cho/Rev)
 - 66. UNDERWATER MOON
- Pan (L) / Pan (R) (Pan/Pan)
 - 74. PAN/PAN

FREEZEPROGRAM

- Freeze (Freeze)
 - 69. FREEZE

REVERB EFFECTS

Reverberation is the warm musical "ambience" you experience when listening to music in a hall or other properly-designed acoustic environment. "Reverb", "FiltRev" and "EchRoom" effects combine with the gate program to control REV output gate. You can vary the length of time it takes for the level of reverberation to decrease.

Main effect name	LCD display	In/out
Reverb	(Reverb)	1in/2out

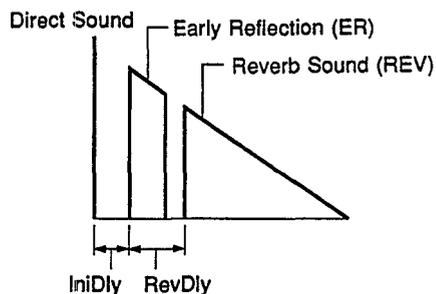
Parameters

- ① RevTyp (Reverb Type: Hall, Room, Vocal, Plate)
 - Hall : a simulating type of reverberation you would experience in a hall.
 - Room : a simulating type of reverberation you would experience in a smaller room.
 - Vocal : a reverb effect ideally suited to vocals.
 - Plate : a type reverberation produced artificially by a plate reverberator.
- ② RevTime (Reverb Time: 0.3sec ~ 480.0sec)

The length of time it takes for the level of reverberation at 1kHz to decrease by +60dB virtually to silence. In a live setting, this depends on several factors: room size, room shape, type of reflective surfaces. The longer the time, the longer it takes for the level of reverberation to decrease to silence.
- ③ HiRatio (High Ratio: RevTime x0.1 ~ x1.0)

Reduces the reverb time of the high frequency in relation to the overall reverb time. Higher values produce longer, high-frequency reverb time, gradually approaching the overall reverb time.
- ④ IniDly (Initial Delay Time: 0.1msec ~ 200.0sec)

This represents the time delay between the direct sound of an instrument in a concert hall and the first of the many reflections that make up reverberation.



- ⑤ Diffuse (Diffusion: 0 ~ 10)

The complexity of the many reflections that make up reverberation varies according to the shape of the room and its contents. As the value is increased, the complexity of the reflections increases producing a thicker, richer sound.

- ⑥ Density (Density: 1 ~ 4)

This parameter determines the density of the reverb reflections (i.e. the average amount of time between reflections). A setting of 1 produces minimum reverb density for a more spacious sound, while a setting of 4 produces the most dense, "tightest" reverberation.
- ⑦ RevDly (Reverb Delay Time: 0.1msec ~ 100.0msec)

Sets the delay time between the beginning of the early reflections -the initial group of sparse reflections that precede the dense reverb sound and the beginning of the reverb sound.
- ⑧ Er/Rev (Early Reflection/Reverb Balance: 0% ~ 100%)

This parameter determines the level balance between the early- reflection portion and final reverberation portion of the reverb sound. At 100%, only the early-reflection sound will be produced. At 0%, only the final reverberation sound will be produced. A setting of about 50% produces both the early-reflection and final reverberation sounds at equal level.
- ⑨ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)

Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ⑩ LPF (Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)

Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set at THRU.
- ⑪ TrgLvl (Trigger Level: 0 ~ 100)

Determines the level of the input signal required to trigger "opening" of the reverb program gate. At 100%, very high level input signals will trigger the gate. Set your own value when inputting the signal.
- ⑫ TrgDly (Trigger Delay Time: -100.0msec ~ 100.0msec)

Determines the time at which the gate is triggered and that at which it actually opens.
- ⑬ Hold (Hold Time: 1msec ~ 24000msec)

Determines how long the gate stays open, allowing the signal to pass.
- ⑭ Release (Release Time: 3msec ~ 24000msec)

Determines how long it takes for the gate to close fully after the HOLD TIME has ended.
- ⑮ MidiTrg (MIDI Trigger: ON, OFF) ★

When this parameter is at ON, a key ON EVENT message from an external MIDI keyboard can be used to trigger the gate. A KEY ON EVENT message is transmitted whenever a note on a MIDI keyboard is played.

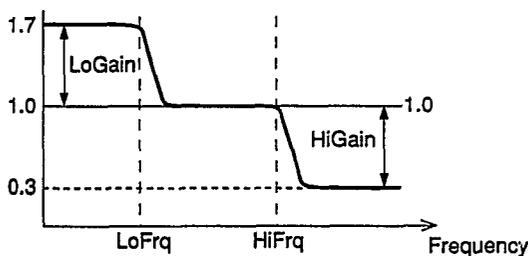
Filtered Reverb (FiltRev)

1in/2out

It is a reverberation that alter the reverb time of the high and low frequency sound.

Parameters

- ① RevTyp (Reverb Type: Hall, Room, Vocal, Plate)
- ② RevTime (Reverb Time: 0.3sec ~ 480.0sec)
- ③ IniDly (Initial Delay Time: 0.1msec ~ 200.0msec)
- ④ Diffuse (Diffusion: 0 ~ 10)
- ⑤ Density (Density: 0 ~ 10)
- ⑥ RevDly (Reverb Delay Time: 0.1msec ~ 100.0msec)
- ⑦ Er/Rev (Early Reflection/Reverb Balance: 0% ~ 100%)
- ⑧ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑨ LPF (Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU) same as Reverb (Normal Reverb)
- ⑩ LoFrq (Low Control Frequency: 40Hz ~ 1.0kHz)
This parameter determines the low frequency for the reverb time. A value below the set value will bring about a low gain.
- ⑪ LoGain (Low Gain: 0.1 ~ 2.4)
Determines the low gain applied to the reverb time.
- ⑫ HiFrq (High Control Frequency: 1.0kHz ~ 10kHz)
This parameter determines the high frequency for the reverb time. A value above the set value will bring about a high gain.
- ⑬ HiGain (High Gain: 0.1 ~ 2.4)
Determines the high gain applied to the reverb time.



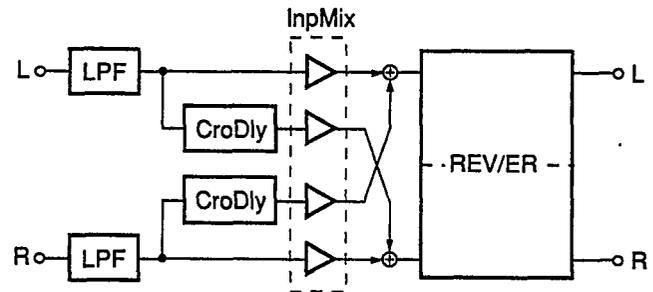
LoGain = 1.7 and HiGain = 0.3 are the frequency responses for the reverb time.

- ⑭ TrgLvl (Trigger Level: 0 ~ 100)
- ⑮ TrgDly (Trigger Delay Time: -100.0msec ~ 100.0msec)
- ⑯ Hold (Hold Time: 1msec ~ 24000msec)
- ⑰ Release (Release Time: 3msec ~ 24000msec)
- ⑱ MidiTrg (MIDI Trigger: ON, OFF) ★
Same as "Reverb" effect.

Stereo Reverb (St.Rev)

2in/2out

The stereo reverb program produces the reverb sound and input sound independently for the left and right channel signals.

**Parameters**

- ① RevTyp (Reverb Type: Hall, Room, Vocal, Plate)
- ② RevTime (Reverb Time: 0.3sec ~ 480.0sec)
- ③ HiRatio (High Ratio: 0.1 ~ 1.0)
- ④ IniDly (Initial Delay Time: 0.1msec ~ 100.0msec)
Same as "Reverb" effect.
- ⑤ InpMix (Input L-R MIX: 0 ~ 1.0)
Sets the mix balance between the inputs of Lch and Rch. A setting at 0 allows only Lch or Rch inputs. A setting of 1.0 combines the two inputs.
- ⑥ CrsDly (Input Cross Delay: 0.1msec ~ 100.0ms)
Sets the delay time when Lch and Rch are mixed. Changes the musical "Ambience" you experience when listening to music in a hall.
- ⑦ Er/Rev (Early Reflection/Reverb Balance: 0% ~ 100%)
- ⑧ Density (Density: 1 ~ 4)
- ⑨ LPF (Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)
Same as "Reverb" effect.

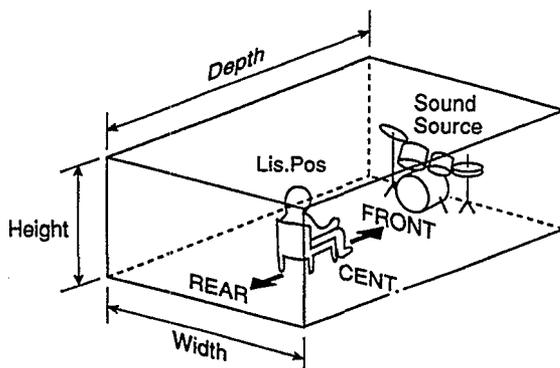
Echo Room (EchRoom)

1in/2out

This is a special type of reverberation in which you have extensive control over the room's dimension and other parameters.

Parameters

- ① Rev Time (Reverb Time: 0.3sec ~ 480.0sec)
- ② HiDump (High Dump: 0.1 ~ 1.0)
Same as Reverb (Normal Reverb).
- ③ IniDly (Initial Delay Time: 0.1msec ~ 200.0msec)
This represents the time delay between the direct sound of an instrument in a concert hall and the first of the many reflections that make up reverberation.
- ④ Width (Width: 0.5m ~ 100m)
Specified the WIDTH of the room in meter.
- ⑤ Height (Height: 0.5m ~ 100m)
Specified the HEIGHT of the room in meter.
- ⑥ Depth (Depth: 0.5m ~ 100.0m)
Specified the DEPTH of the room in meter.
- ⑦ WidDec (Width Decay: RevTime x0.1 ~ x10.0)
Among the REV components, this sets the reverberation time of the REV components specified with WIDTH to a multiplier value corresponding to the REV TIME. It simulates the acoustic properties of the side walls.
- ⑧ HeiDec (Height Decay: RevTime x0.1 ~ x10.0)
- ⑨ DepDec (Depth Decay: RevTime x0.1 ~ x10.0)
In the same way as for Width Decay, this sets a multiplier value corresponding to REV TIME for reverberation time felt in relation to the HEIGHT (vertical direction) in the height direction and that felt for the DEPTH in the front-to-back direction. It also simulates the acoustic properties of the walls in the vertical and front-to-back directions.
- ⑩ Wall (Wall Vary: 0 ~ 30)
This sets each of the value specified with WALL VARY as the reference value (0) and is the parameter for further fine adjustment.
- ⑪ Lis.Pos (Listening Position: FRONT, CENT., REAR)
Sets the position where the listener is supposed to be seated.



- ⑫ Diffuse (Diffusion: 0 ~ 10)
- ⑬ Er/Rev (Early Reflection/Reverb Balance: 0% ~ 100%)
- ⑭ RevDly (Reverb Delay Time: 0.1msec ~ 100.0msec)
- ⑮ Density (Density: 0 ~ 4)
- ⑯ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑰ Lpf (Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)
Same as "Reverb" effect.
- ⑱ WidFin (Width Fine: -100 ~ +100)
- ⑲ HeiFin (Height Fine: -100 ~ +100)
- ⑳ DepFin (Depth Fine: -100 ~ +100)
- ㉑ WalFin (Wall Vary Fine: -100 ~ +100)
This sets each of the value specified with WIDTH, HEIGHT, DEPTH and WALL VARY as the reference value (0) and is the parameter for further fine adjustment.
- ㉒ TrgLvl (Trigger Level: 0~100)
- ㉓ TrgDly (Trigger Delay Time: -100.0msec ~ 100.0msec)
- ㉔ Hold (Hold Time: 1 msec ~ 24000msec)
- ㉕ Release (Release Time: 3msec ~ 24000msec)
- ㉖ MidiTrg (MIDI Trigger: ON, OFF) ★
Same as "Reverb" effect.

● GATE

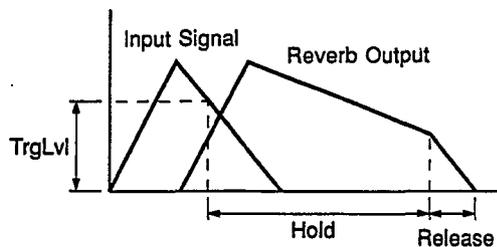
The reverb time of SPX990 can be set at a max. time of 480sec. When combined with GATE, this reverb time which remains long can produce a sound that has a short fade-out effect. The "GateRev" effect applies the early reflection while the reverb effect combined with GATE applies the reverb sound to produce a better sound quality and sharper sound by cutting the reverb sound halfway. Thus the combination of the reverb effect and GATE can provide us the convenience of many usages. GATE is a kind of switch which controls the signal input and opening and closing of the gate. Thus, the gate is opened when the signal passed through and closed when the signal is cut.

TRIGGER

The gate will be opened by any triggers. The trigger is mainly the strength of signals. The gate opens to let the signal pass when the signal strength is higher than a certain level and closes to stop the signal when the signal strength is lower than the level. TrgLvl can determine the level.

Hold and Release

A sound with a very short signal will pass the gate at a small level immediately if it exceeded TrgLvl and the gate will be open only during that time. During the time of Hold, however, the gate can remain open even after the strength gets weaker. If the signal strength remains stronger than a certain level, it works as a re-trigger and the gate can also remain open during the time. Also, the time when the gate starts to close and when it closes completely can be set longer for the slow fade-out sound. This can be done by the Release function.



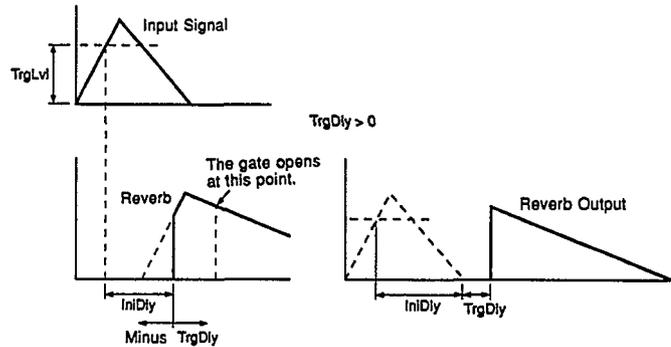
OTHER TRIGGERS

Triggering by signal strength is not the only way to open the gate but a trigger by foot switch connected to the trigger terminal on the rear panel and a trigger by MIDI NOTE ON are other ways. For instance, if TrgLvl = 100 is set, signal cannot be transmitted as the trigger does not work even if a strongest signal comes. But if MIDI NOTE ON signal is sent or the TRIGGER ON operation is done by foot switch, the gate will open during the time set by Hold to let the signal be transmitted. At this moment the setting of Release is also effective.

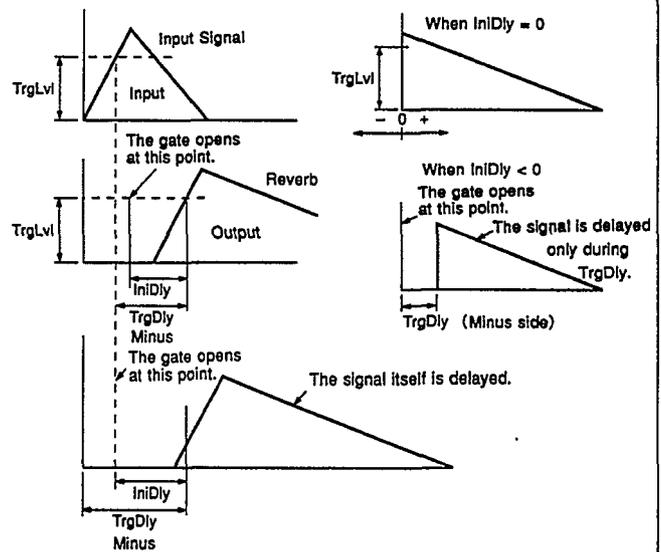
MidiTrg must be set at ON if you use a trigger from MIDI.

TrgDly

When the parameter TrgDly is set at 0, the gate opens after the initial delay since the input signal exceeds TrgLvl. When $\text{TrgDly} > 0$, the gate opens after the time prior from the initial delay.



A setting of minus value for TrgDly will open the gate before the initial delay. This is effective for slow-starting input. When TrgDly is minus value and the absolute value is bigger than that of the initial delay, the gate opens before the signal level reaches TrgDly by letting the signal sound itself be delayed.

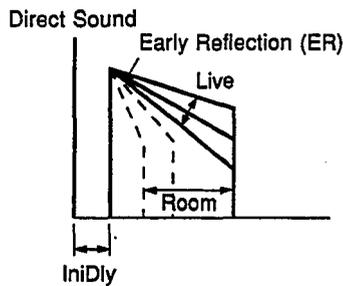


NOTE: When TrgDly is set at 0, the gate will always remain open. Here, other trigger sources (TRIGGER FOOT SWITCH, MIDI NOTE ON) are not effective.

If triggers occur continuously from other trigger sources when the TrgDly is higher than a certain level and the gate is closed, the gate may remain open because the gate is controlled by other trigger sources and the opening time of the gate is determined by setting of Hold, therefore if a trigger is done during the Hold time it is considered as a re-trigger and the gate will remain open by continuous triggers.

ER (EARLY REFLECTION) EFFECTS

ER effects are created using different groupings of "Early Reflection" the first cluster of reflections that occurs after the direct sound but before the dense reflections that are known as reverberation begin. This produces interesting results in the drum, percussion, guitar and some other brass instruments.



Thin Early Reflection (ThinER)	1in/2out
Fat Early Reflection (FatER)	1in/2out

The "ThinER" effect has a low density whereas the "FatER" effect has a high effect.

Gate Reverb (GateRev)	1in/2out
------------------------------	-----------------

The gate reverb program combines reverb with a 'gate' that has programmable threshold and release time parameters. All other parameters are the same as those in the reverb effect.

Reverse Gate (Reverse)	1in/2out
-------------------------------	-----------------

This program has the reverb effect to reverse the gate.

Parameters:

① ErType (Early Reflection Type)

Selects the ER patterns. Since the sound level depends on these patterns, this parameter sets an important base for editing a program.

[ThinER]

[FatER]

S-Hall (SmallHall), L-Hall (Large Hall), Random, Reverse, Plate, Spring

[Gate Rev]

Type-A, Type-B

[Reverse]

Type-A, Type-B

② Room (Room Size: 0.1 ~ 25.0)

This parameter sets the time intervals between the early reflections and a feature of natural early reflections which is directly proportional to the size of the room.

③ Live (Liveness: 0 ~ 10)

"Liveness" refers to the rate at which the reflected sounds fade. An acoustically "dead" room is simulated by setting this parameter to zero. Increasing the value of this parameter creates an increasing "live" sound, simulating an increasing area of reflective surfaces in the room.

④ Diffuse (Diffusion: 0 ~ 10)

Refers to the clearness of the sound. As the value is increased, the complexity of the reflections increases producing a thicker and richer sound.

⑤ IniDly (Initial Delay Time: 0.1msec ~ 400msec)

Initial delay is the time between the beginning of the direct sound and the beginning of the early reflection.

⑥ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)

Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.

⑦ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set to THRU.

⑧ Er Number (Early Reflection Number: 1 ~ 19)

This parameter directly sets the number of early reflections produced from 1 to 19.

⑨ FbDly (Feed Back Delay Time: 0.1msec ~ 900msec)

The parameter sets a delay time between the beginning of the original early reflections and the first of the repeats caused by feedback. Shorter FbDly times simply thicken the early reflection sound while longer FbDly times can create extended or repeated early reflection effects.

⑩ FbGain (Feed Back Gain: -99% ~ +99%)

The parameter determines how many times (for how long) the early reflection are repeated. The lower the setting, the lesser is the feed back.

⑪ FbHigh (High Frequency Feed Back Gain: 0.1 ~ 1.0)

The parameter determines how much of the high frequency content of the original early reflections is fed back. The lower the setting, the less of the original high frequencies are fed back. This causes a gradual decrease in high frequency content at each repeat.

⑫ Density (Density: 0~3, "FatER" effect 1 ~ 3)

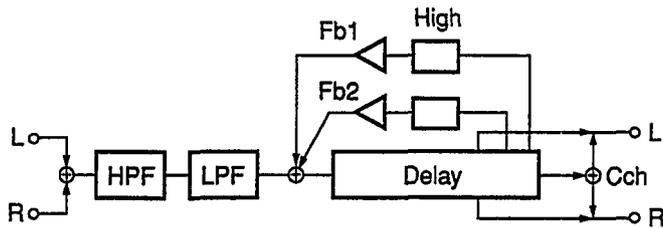
This parameter determines the density of the reverb reflections (i.e. the average amount of time between reflections.) A setting of 0 or 1 produces minimum reverb density for a more spacious sound, while a setting of 3 produces the most dense, "tightest" reverberation. There is no density parameter for "ThinER".

DELAY, ECHO EFFECTS

Delay L, C, R (Dly-LCR)

1in/2out

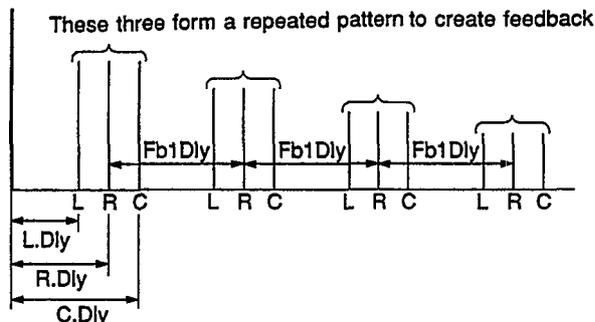
These sophisticated delay effects offer independently variable left, center and right channel delays. There are two types of feed back stereo delays.



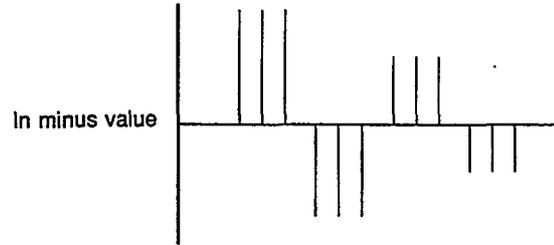
Parameters

- ① L.Dly (Lch Delay Time: 0.1msec ~ 1480.0msec)
- ② R.Dly (Rch Delay Time: 0.1msec ~ 1480.0msec)
- ③ C.Dly (Center ch Delay Time: 0.1msec ~ 1480msec)
These parameters individually set the time between the direct sound of the instrument and the first repeat heard from the left, right and center channels.
- ④ C.Lvl (Center ch Delay Level: -200% ~ +200%)
Adjusts the level of the center-channel delay signal. A minus value produces the reverse phase result.
- ⑤ Fb1Dly (FeedBack 1 Delay Time: 0.1msec ~ 1480msec)
Feedback refers to the repeated pattern of 3 delay sounds. The diagram below shows the setting of interval among the repeated pattern of the 3 delay sounds. You can set 2 feedbacks and the diagram above shows 1 form of feedback. Fb1Dly is one of the delay times between 2 feedbacks.

Direct Sound

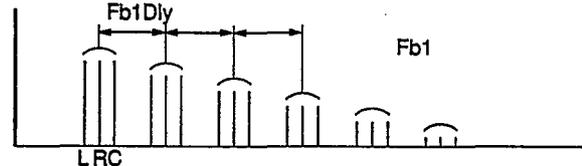


- ⑥ Fb1Gain (Feed Back 1 Gain: -99% ~ +99%)
Sets the amount of Fb1 fed back to the input of the processor. The higher the feedback gain setting, the greater the number of delayed repeats produced by the corresponding feedback loop.

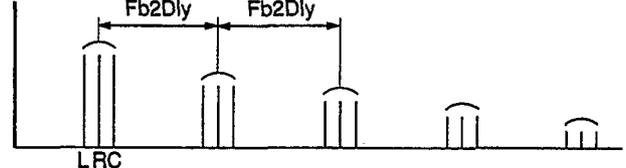


- ⑦ Fb2Dly (Feed Back 2 Delay Time: 0.1msec ~ 1480.0msec)
- ⑧ Fb2Gain (Feed Back 2 Gain: -99% ~ +99%)
Sets the amount of Fb2 fed back to the input of the processor. The higher the feedback gain setting, the greater the number of delayed repeats produced by the corresponding feedback loop.

Direct Sound



Direct Sound



NOTE: Since the sound effect is influenced by Fb1 and Fb2, the interference of Fb1 and Fb2 creates an interesting sound.

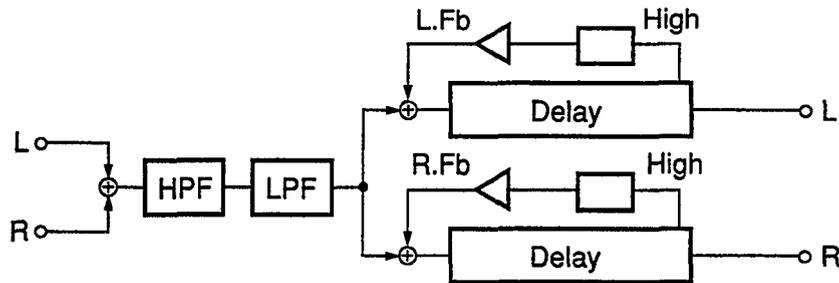
NOTE: Be sure not to allow the gains of Fb1 and Fb2 to exceed 100%.

- ⑨ High (High Frequency Feed Back Gain: 0.1 ~ 1.0)
Controls feedback Fb1 and Fb2 in the high frequency range. The high frequency feedback is reduced as the value of this parameter is decreased.
- ⑩ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Permits rolling off the low frequency contents of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ⑪ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits rolling off high frequency content of the reverb signal above the set frequency. The LPF is OFF when set to THRU.

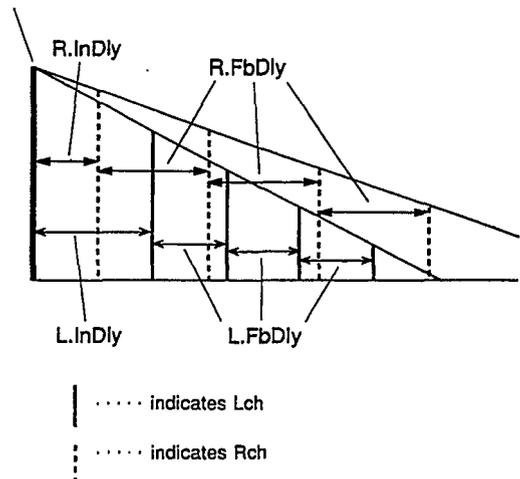
Echo (Echo)

1in/2out

The echo effect offers independently variable left and right echo intervals.

**Parameters**

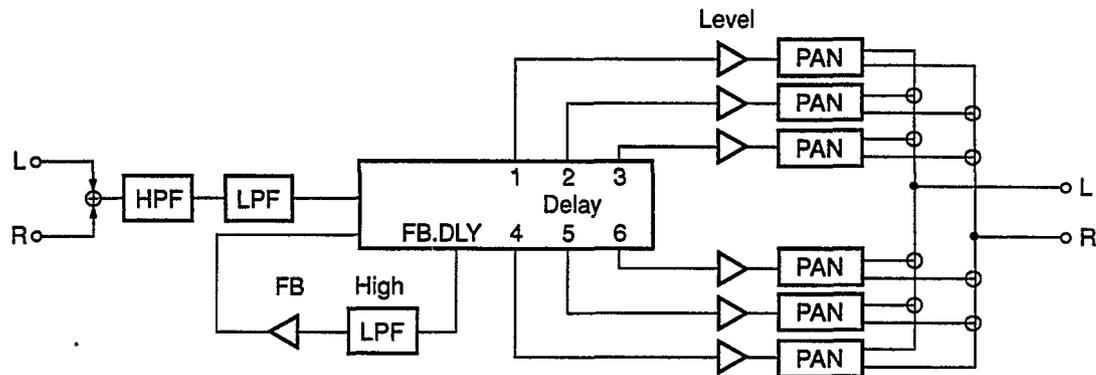
- ① L.FbDly (Lch Feed Back Delay: 0.1msec ~ 740.0msec)
Sets the time between the echo sound and the first repeat heard from the left channel.
- ② L.Fb (Lch Feed Back Gain: -99% ~ +99%)
Individually set the amount of the left channel echo signal fed back to the left channel input of the processor. The lower the feedback gain setting, the smaller the number of echo repeats produced by the feedback loop.
- ③ R.FbDly (Rch Feed Back Delay: 0.1msec ~ 740.0msec)
Sets the time between the echo sound and the first repeat heard from the right channel.
- ④ R.Fb (Rch Feed Back Gain: -99% ~ +99%)
Individually set the amount of the right channel echo signal fed back to the right channel input of the processor. The higher the feedback gain setting, the greater the number of echo repeats produced by the feedback loop.
- ⑤ High (High Frequency Feed Back Gain: x0.1 ~ x1.0)
Controls feedback amount of L.Fb and R.Fb in the high frequency range. Sets the amount of the left channel echo signal to be fed back to the left channel input of the processor. The lower the feedback gain setting, the smaller the number of echo repeats produced by the feedback loop.
- ⑥ L.InDly (Lch Initial Delay: 0.1msec ~ 740.0msec)
- ⑦ R.InDly (Rch Initial Delay: 0.1msec ~ 740.0msec)
These parameters individually set the time between the direct sound of the instrument and the first repeat heard from the left and right channel.
- ⑧ HPF (High Pass Filter Frequency; THRU, 32Hz ~ 1.0kHz)
Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ⑨ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set to THRU.

Direct Sound

Mulli Tap Delay (Mlt. Tap)

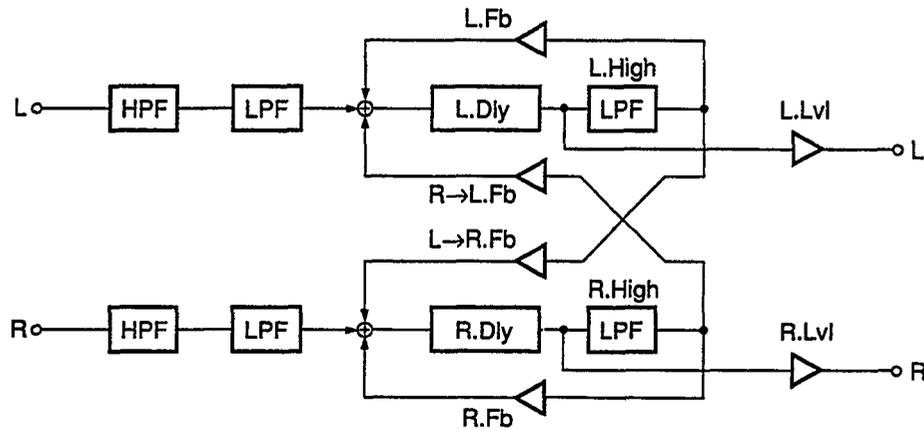
1in/2out

This is a multi-tap delay effect in which the time, stereo position and level of up to 6 separate delays can be individually programmed.

**Parameters**

- ① Delay1 (Delay1: 0.1msec ~ 1480.0msec)
The first delay time. The time when the first tap delay sound occurs.
- ② Level1 (Level1: -100% ~ +100%)
The output level of the first tap delay sound. A minus value produces a reverse-phase delay sound.
- ③ Pan1 (Pan1: 100/0 ~ 0/100)
Sets the stereo position of this first tap delay sound. A setting at 100/0 positions the sound all the way to the left. 0/100 delays sound to the right and 50/50 delays sound at the center.
- ④ Delay2 (Delay2: 0.1msec ~ 1480.0msec)
- ⑤ Level2 (Level2: -100% ~ +100%)
- ⑥ Pan2 (Pan2: 100/0 ~ 0/100)
Sets the second tap delay sound.
- ⑦ Delay3 (Delay3: 0.1msec ~ 1480.0msec)
- ⑧ Level3 (Level3: -100% ~ +100%)
- ⑨ Pan3 (Pan3: 100/0 ~ 0/100)
Sets the third tap delay sound.
- ⑩ Delay4 (Delay4: 0.1msec ~ 1480.0msec)
- ⑪ Level4 (Level4: -100% ~ +100%)
- ⑫ Pan4 (Pan4: 100/0 ~ 0/100)
Sets the fourth tap delay sound.
- ⑬ Delay5 (Delay5: 0.1msec ~ 1480.0msec)
- ⑭ Level5 (Level5: -100% ~ +100%)
- ⑮ Pan5 (Pan5: 100/0 ~ 0/100)
Sets the fifth tap delay sound.
- ⑯ Delay6 (Delay6: 0.1msec ~ 1480.0msec)
- ⑰ Level6 (Level6: -100% ~ +100%)
- ⑱ Pan6 (Pan6: 100/0 ~ 0/100)
Sets the sixth tap delay sound.
- ⑲ FbDly (Feed Back Delay Time: 0.1msec ~ 1480msec)
Sets the delay time when the feedback delay sound occurs.
- ⑳ FbGain (Feed Back Gain: -99% ~ 99%)
Sets the output level of the feedback delay sound.
- ㉑ High (High Frequency Feed Back Gain: x0.1 ~ x1.0)
Sets the cut-off frequency of the high frequency applied to the feedback signal.
- ㉒ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ㉓ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set to THRU.

The stereo echo effect offers independently variable left and right channel initial delays and echo intervals.



Parameters

- ① **L.Dly (Lch Feed Back Delay: 0.1msec ~ 740.0msec)**
Sets the time between the echo sound and the first repeat heard from the left channel.
- ② **L.Fb (Lch Feed Back Gain: -99% ~ +99%)**
Individually sets the amount of the left channel echo signal fed back to the left channel input of the processor. The lower the feedback gain setting, the smaller the number of echo repeats produced for the corresponding channel.
- ③ **LLvl (Lch Level: -100% ~ +100%)**
Sets the output level of the echo sound from the left channel.
- ④ **R.Dly (Rch Feed Back Delay: 0.1msec ~ 740.0msec)**
Sets the time between the echo sound and the first repeat from the right channel.
- ⑤ **R.Fb (Rch Feed Back Gain: -99% ~ 99%)**
Individually sets the amount of the right channel echo signal fed back to the right channel input of the processor. The lower the feedback gain setting, the smaller the number of delayed repeats produced for the corresponding channel.
- ⑥ **R.Lvl (Rch level: -100% ~ 100%)**
Sets the output level of the echo sound from the right channel.
- ⑦ **L → R.Fb (L → R Cross Feed Back: -99% ~ +99%)**
Sets the echo sound from the left channel output to be fed back to the right channel input.
- ⑧ **R → L.Fb (R → L Cross Feed Back: -99% ~ +99%)**
Sets the echo sound from the right channel output to be fed back to the left channel input.
- ⑨ **L.High (Lch High Frequency Feed Back Gain: x0.1 ~ x1.0)**
Controls feedback in the high frequency range from L.Fb to R.Fb. The high frequency feedback is reduced as the value of this parameter is decreased.
- ⑩ **R.High (Rch High Frequency Feed Back Gain: x0.1 ~ x1.0)**
Controls feedback in the low frequency range from R.Fb to L.Fb. The lower frequency feedback is reduced as the value of this parameter is decreased.
- ⑪ **HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)**
Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ⑫ **LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)**
Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set at THRU.

NOTE: Be sure not to increase the value of Feedbacks beyond its limit or a wild sweeping sound will be produced.

As the delay time of the following three effects can be determined by parameters of "Tempo" and "Note", you can easily adjust the delay time to the music tempo.

Tempo Mono Delay (TmpEch1)	1in/2out
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Determines single delay of stereo-out.

Tempo Stereo Echo (TmpEch2)	2in/2out
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Determines stereo echo of completely independent Lch and Rch.

Tempo Quad Echo (TmpEch4)	2in/2out
----------------------------------	-----------------

This enables only one delay machine to produce the effect which has been produced by four delay machines so far. Two couples of machines can control four delay lines.

● How to input the "TEMPO" parameter

The following are five ways to input "TEMPO" parameter.

- Manual Input
Like the other parameter, set the parameter by numeral value on the Parameter Edit Mode.
- Tap Input (by Function Keys)
Set the parameter by the interval between the function key pressed two times on the Parameter Edit Mode.
- Tap Input (by Footswitch)
Set the parameter by pressing the footswitch which is connected to the back panel's "Trigger" terminal twice.
- MIDI Clock Input
Set the music tempo by MIDI clock.
- MIDI Control Change
Like the other parameter, set parameter by control change.

You can choose to input by setting "Trig." parameter.

SETTING OF "Trig." PARAMETER	OFF	TAP	MIDI
MANUAL INPUT	O	O	O
TAP INPUT (by FUNCTION KEY)	x	O	x
TAP INPUT (by FOOT SWITCH)	x	O	x
MIDI CLOCK INPUT	x	x	O
MIDI CONTROL CHANGE	O	O	O

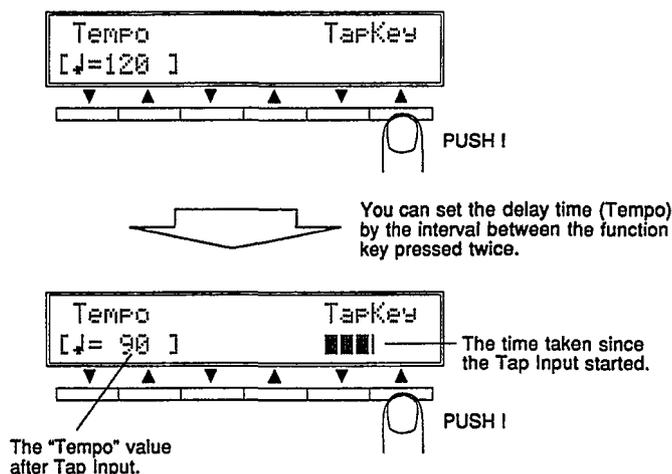
● TAP INPUT

You can set the delay time suitable for the music tempo in intervals by pressing soft keys or foot switch twice. For instance, you have only to press the foot switch for just one beat to the music tempo to produce the right delay time of one beat matching the music tempo. In this case, you don't have to set parameter on Edit Mode.

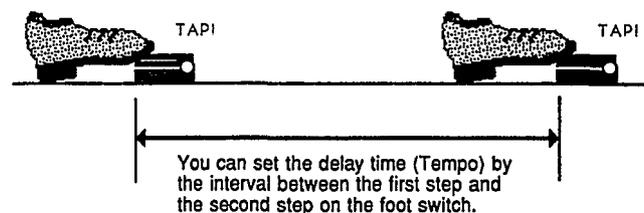
In fact, the delay time is not directly set, but rather the "Tempo" parameter is set by the Tap Input. The delay time is determined by the "Tempo" and the preset "Note".

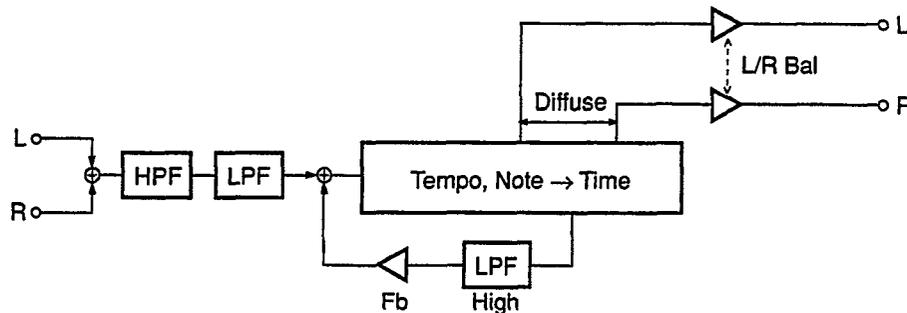
If you execute the Tap Input operation when "TapKey" appears, the bar graphs will be displayed on the LCD. It shows how many msec have passed since you started Tap Input and displays 250 msec per character (50 msec per dot). However, note that the bar graphs will disappear when it exceeds delay time set.

- Tap input by function ▼ and ▲ Keys



- Tap Input by Foot Switch



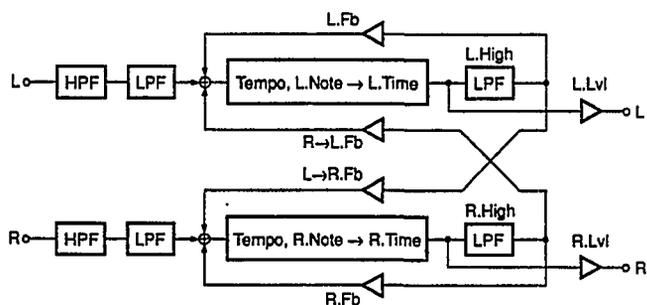


Parameters

- ① **Tempo** (Tempo: ♩ = 41 ~ 250)
Indicates the numbers of a quarter note which are played in one minute (beat/minute).
- ② **Note** (Note: ♩, ♪, ♫, ♮, ♯, ♭, ♮., ♮.)
Determines the length of sound by notes. The delay time is expressed by the length of an eighth note when the tempo = 100. The actual delay time is calculated and indicated as a parameter in Time.
- ③ **Time** (Time: ±10msec)
The delay time calculated in ① Tempo and ② Note is indicated. The delay time can be adjusted in the range of ±10 msec.
If the delay time set (indicated) here equals to the delay time calculated in ① Tempo and ② Note (if the adjusted value is 0 msec), - will be indicated on the left side of the parameter. If the value calculated is greater than the delay time set, "↓" will appear and "↑" will appear for a lesser value.
NOTE: This value is stored even if the parameter of "Tempo" and "Note" is changed.
- ④ **FbGain** (Feed Back Gain: -99 ~ +99)
Sets the output level of the feedback delay sound.
- ⑤ **High** (High Frequency Feed Back Gain: x0.1 ~ x1.0)
Controls the feedback amount of Fb in the high frequency range. Sets the amount of delay sound to be fed back to the input of the processor. The lower the feedback gain setting, the smaller the number of delay repeats produced by the feedback loop. A minus value produces the reverse phase result.
- ⑥ **Diffuse** (Diffusion: 0 ~ 10)
Controls the loudness and clearness of the sound. As the diffusion value is increased, a thicker and richer sound is produced.
- ⑦ **L/R Bal** (Lch/Rch Balance: 100/00 ~ 00/100)
Sets the sound balance of the stereo. A setting at 100/0 positions the sound all the way to the left. 0/100 delays sound to the right and 50/50 delays sound at the same level between Lch and Rch. It is convenient to use this parameter to correct the balance of sound when a delay sound is one-sided caused by bigger parameter value of ⑥ Diffuse. You can also use this parameter to set the desired delay sound balance.
- ⑧ **Trig.** (Trigger: OFF, TAP, MIDI)
Selects the input of the tempo parameter.
- ⑨ **Tempo** (Tempo: ♩ = 41 ~ 250)
Displays the "Tempo" input value by TapKey (function key), footswitch or MIDI.
- ⑩ **TapKey** ★
Sets the interval between the function key pressed twice when the "Tempo" parameter is tap input by function ▼ and ▲ keys.
- ⑪ **HPF** (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set at THRU.
- ⑫ **LPF** (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set at THRU.

Tempo Stereo Echo (TmpEch2)

2in/2out



Parameters

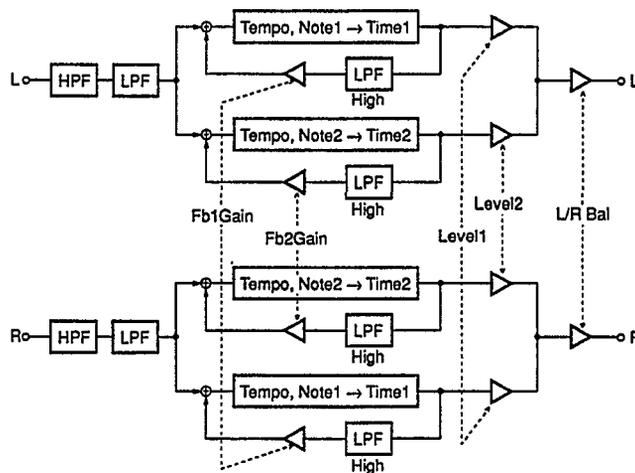
- ① Tempo (Tempo: ♩ = 82 ~ 250)
- ② LNote (Lch Note: ♯, ♮, ♯♯, ♮, ♯♯, ♮., ♩)
- ③ R.Note (Rch Note: ♯, ♮, ♯♯, ♮, ♯♯, ♮., ♩)
- ④ L.Time (Lch Time: ±10msec)
- ⑤ RTime fRch Time: ±10msec)
- ⑥ L.Lvl (Lch Level: -100% ~ +100%)
- ⑦ R.Lvl (Rch Level: -100% ~ +100%)
- ⑧ LFb (Lch Feed Back Gain: -99% ~ +99%)
- ⑨ R.Fb (Rch Feed Back Gain: -99% ~ +99%)
- ⑩ L → R.Fb (L → R Cross Feed Back: -99% ~ +99%)
- ⑪ R → LFb (R → L Cross Peed Back: -99% ~ +99%)
- ⑫ L.High (Lch High Frequency Peed Back Gain: x0.1 ~ x1.0)
- ⑬ R.High (Rch High Frequency Feed Back Gain: x0.1 ~ x1.0)
- ⑭ Trig. (Trigger: OFF, TAP, MIDI)
- ⑮ Tempo (Tempo: ♩ = 82 ~ 250)
- ⑯ TapKey ★
- ⑰ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑱ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

NOTE: This delay time of this effect can be set in Tempo, Note or Time. See page 33 for "St. Echo" effect for the definitions of parameters.

NOTE: Be sure not to raise the value of Feedback beyond set value.

Tempo Quad Echo (TmpEch4)

2in/2out



Parameters

- ① Tempo (Tempo: ♩ = 82 ~ 250)
- ② Note1 (Note 1: ♯, ♮, ♯♯, ♮)
- ③ Note2 (Note 2: ♯, ♮, ♯♯, ♮)
- ④ Time1 (Time 1: ±5msec)
- ⑤ Time2 (Time 2: ±5msec)
- ⑥ Diffuse (Diffusion: 0 ~ 10)
- ⑦ Level1 (Level 1: -100% ~ +100%)
- ⑧ Level2 (Level 2: -100% ~ +100%)
- ⑨ L/R Bal (Lch/Rch Balance: 100/00 ~ 00/100)
- ⑩ Fb1Gain (Feed Back 1 Gain: -99% ~ +99%)
- ⑪ Fb2Gain (Feed Back 2 Gain: -99% ~ +99%)
- ⑫ High (High Frequency Feed Back Gain: x0.1 ~ x1.0)
- ⑬ Trig. (Trigger: OFF, TAP, MIDI)
- ⑭ Tempo (Tempo: ♩ = 82 ~ 250)
- ⑮ TapKey ★
- ⑯ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑰ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

NOTE: The parameter set by Note1 and Note2 is the same as "TmpEch1" effect. See page 35 "TmpEch1" effect for the definitions of parameters.

NOTE: Be sure not to set the value of feedback to beyond the set value.

MOD (MODULATION) EFFECTS

When the different delay times of sound are mixed, the tone will be changed by the phase difference. A tone change effect can be produced by modulating the delay time and the level of delay sound.

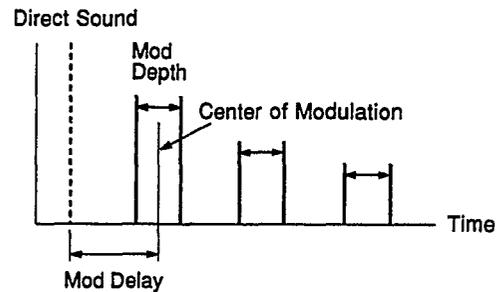
Flange (Flangar)	2in/2out
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Dual Flange (DualFlg)	2in/2out
-----------------------	----------

The flanging effect is produced by varying the delay between 2 identical signals, thus producing a complex varying "Comb Filter" effect.

Parameters

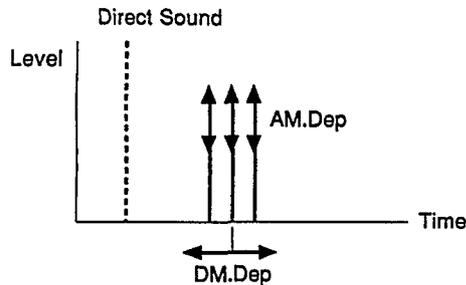
- ① ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
Sets the speed of modulation and hence the rate at which the effect varies.
- ② Depth (1, 2)(Modulation Depth: 0% ~ 100%)
Sets the amount of delay time variation thus adjusting the depth of the effect. A bigger value will give at deeper modulation.
- ③ Delay (1, 2)(Modulation Delay Time: 0.1msec ~ 100.0msec)
Sets the basic delay time from the initial direct sound to the beginning of the flange effect. A setting of 1.0 msec and below causes interference in the high frequency.
- ④ Phase (Phase: -180.0deg ~ +180.0deg)
Sets the phase between Modulation Delay 1 and 2.
- ⑤ FbGain (Feed Back Gain: 0% ~ 99%)
Determines the amount of flange signal to be fed back to the input of the processor for further modulation. More feedback increases the overall complexity, "strength" and decay time of the effect.
- ⑥ InMode (Input Mode: Mix, Stereo)
Selects the input mode between the mixed sound of the left and right channels and stereo source.
- ⑦ HPF (high Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Permits rolling off the low frequency content of the reverb signal above the set frequency. The HPF is OFF when set to THRU.
- ⑧ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits the rolling off the high frequency content of the reverb signal above the set frequency. The LPF is OFF when set at THRU.



FM Chorus (FM.Cho)

2in/2out

The chorus effect combines delay time and amplitude modulation to effectively thicken and add warmth to the sound.

**Parameters**

- ① ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
Sets the speed of modulation and hence the rate at which the chorus effect varies.
- ② DM.Dep (Delay Time Modulation Depth: 0% ~ 100%)
Sets the amount of delay time variation between Lch and Rch, thus adjusting the depth of the effect.
- ③ AM.Dep (Amplitude Modulation Depth: 0% ~ 100%)
Sets the depth of amplitude modulation. Higher values produce deeper amplitude modulation.
- ④ InMode (Input Mode: Mix, Stereo)
Selects the input mode between the mixed sound of left and right channels and stereo source.
- ⑤ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Sets the cutoff frequency of the high pass filter. The HPF is OFF when set to THRU.
- ⑥ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Sets the cutoff frequency of the low pass filter. The LPF is OFF when set at THRU.

AM Chorus (AM.Cho)

2in/2out

This effect adds more modulation variations to the sound than FM.Cho effect.

Parameters

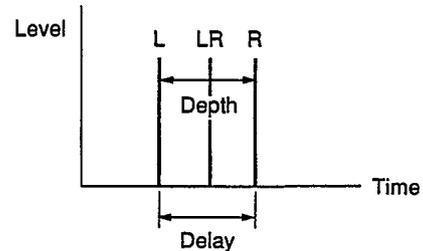
- ① ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
- ② Depth (Delay Time Modulation Depth: 0% ~ 100%)
- ③ InMode (Input Mode: Mix, Stereo)
- ④ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑤ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

NOTE: See page 37 on "Flanger" effect for the definitions of parameters.

Phaser (Phaser)

2in/2out

This is an excellent simulation of traditional "phaser" effect, producing a gentle phase - shift sound that can be used to add extra animation to a wider range of source signals.

**Parameters**

- ① ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
- ② Depth (Delay Time Modulation Depth: 0% ~ 100%)
- ③ Delay (Modulation Delay Time: 0.1msec ~ 5.0msec)
- ④ InMode (Input Mode: Mix, Stereo)
- ⑤ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑥ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

NOTE: See page 37 on "Flanger" effect for the definitions of parameters.

Symphon (Symphonic)

2in/2out

This broad sweep effect adds a sense of scale to the sound than the "FM.Cho" effect.

Parameters

- ① ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
- ② Depth (Delay Time Modulation Depth: 0% ~ 100%)
- ③ InMode (Input Mode: Mix, Stereo)
- ④ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
- ⑤ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

NOTE: See page 37 on "Flanger" effect for the definitions of parameters.

PITCH CHANGE EFFECTS

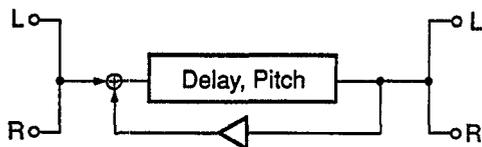
When the sound of voice and musical instruments are inputted, this effect produces the pitch change sound.

Mono Pitch Change, Dual Pitch Change and Triple Pitch Change has an Intelligent Pitch function which can produce pitch shift sound against the inputted sound according to a specified scale as a chromatic harmony pitch change.

Mono Pitch Change (MonoPit)

1in/1out

The Mono Pitch program produces a single pitch-shifted note. The pitch parameter can be varied while playing (e.g. using an external controller) to provide a smooth real time pitch variation.



Parameters

① Intelli (Intelligent: ON, OFF)

The switch for ON/OFF function of the intelligent function. A setting at ON will display the intelligent function screen of ② ~ ⑨ and ⑪ ~ ⑬. A setting at OFF will display a Chromatic Pitch Change screen of ⑩ ~ ⑭.

② Key (Key: C ~ B) ★

Determines the tone among the inputted sound. The key set here is equivalent to the tonic of InNote to be set.

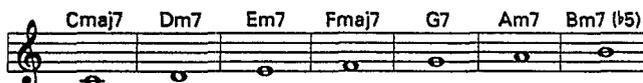
③ Scale (Scale Type) ★

Selects the type of scale among 12 sound. There are 7 sounds in the preset effect and 2 sounds in the user memory scale.

NOTE: The sound of the preset scale is simply piled up centering on 3-degree and 7-degree sound. Therefore, we would like to recommend you to arrange the preset sound to make your own user scale, taking into account the balance of other musical instrument.

• Preset Scale

Major



Minor



Dorian



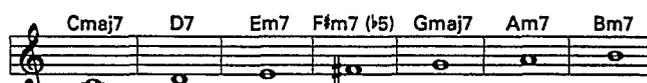
Wole Tone



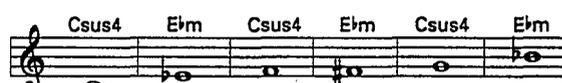
Pentatonic



Lydian



Blues



④ InNote (Input Note: Tonic ~ 7th) ★

Sets the input note.

⑤ Pitch (Pitch: ↓ Oct ~ ↑ Oct) ★

Sets the necessary pitch to be changed for the input note.

⑥ Save To (User-Scale: 1,2) ★

The effect can be saved in the user-scale 1 or 2. Press any function ▼ or ▲ key under "Yes" display to save or "No" to cancel a program. Any program edited will not be saved if not store when selecting other effects.

⑦ Source (Control Source: Signal, MIDI) ★

Selects between signal or MIDI'S NOTE ON message as a control source.

⑧ Sense (Control Sense: 0-5) ★

Sets the control sense of frequency input signal.

⑨ Tune (Tune: 438Hz - 445Hz) ★

Sets the tuning of the pitch-shift note.

⑩ Pitch (Pitch: ↓ Oct~ ↑ Oct) ★

This determines the musical interval between the pitch change sound and original sound. You can specify it in the semi-tone steps "↓Oct" produces one octave sound below and "↑Oct" produces one octave sound above "Unison" produces the original sound.

This musical interval can become the pitch change sound when feedback is applied. For instance, if you set this parameter to "↑1/2nd" and apply feedback to this, C3 sound can be inputed. The semi-tone steps will move up and echo-like sound will be produced.



⑪ Fine (Pitch Fine: -100 ~ +100)

Permits fine tuning of the first pitch shift note in the 1 cent steps (1/100 pitch). A setting at +100 produces high pitch sound higher than the set pitch in ⑤.

⑫ Delay (Delay Time: 0.1msec ~ 1200.0msec)

Determines the time delay between input of the original note and the output of the first pitch-shifted note.

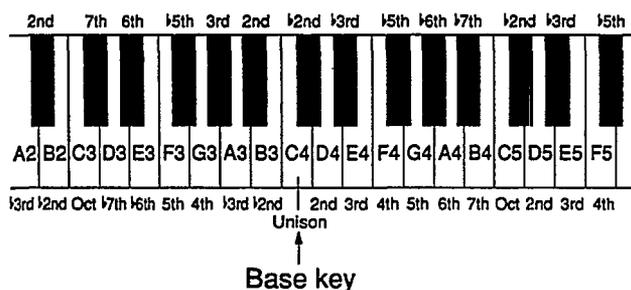
⑬ FbGain (Feed Back Gain: -99% ~ +99%)

Determines the amount of pitch change to be fed back into the input of the processor. When this parameter is set at 0, only a single pitch-shifted sound is produced after the delay time has elapsed. As the value of this parameter is increased, more and more delayed repeats are produced.

⑭ Base Key (Base Key: OFF, C1 ~ C6) ★

This parameter sets the Base Keys for an external MIDI synthesizer used to control the PITCH parameter.

By the MIDI NOTE ON message, pitch change can be controlled. If, for example, the Base Key is set to C4, pressing the C3 key on the synthesizer will set the pitch change note.



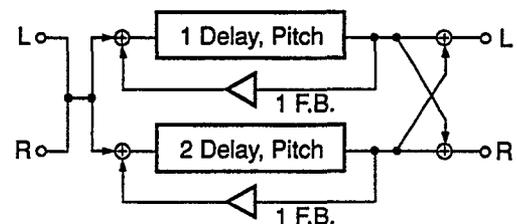
NOTE: Pitch is set at a range of ±octaves.

NOTE: If the Base Key parameter is set at OFF, pitch cannot be controlled via the MIDI NOTE ON message.

NOTE: During MIDI NOTE ON message, the NOTE ON signal controls the "Pitch" parameter.

Dual Pitch Change (DualPit) 1in/2out

The Dual Pitch Change program produces 2 pitch-shifted notes in addition to the original input note. The two pitch-shifted notes are independently fed to the left and right channel outputs for a true stereo harmony effect.



Parameters

① Intelli (Intelligent: ON, OFF)

The switch for ON/OFF function of the intelligent device. A setting of ON will display on the intelligent function screen of ② ~ ⑩, ⑬ ~ ⑭ and a setting of OFF will display a Chromatic Pitch Change screen of ⑪ ~ ⑮.

② Key (Key: C ~ B) ★

③ Scale (Scale Type) ★

④ InNote (Input Note: Tonic ~ 7th) ★

⑤ Pitch 1 (Pitch 1: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑥ Pitch 2 (Pitch 2: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑦ Save To (User-Scale: 1, 2) ★

⑧ Source (Control Source: Signal, MIDI) ★

⑨ Sense (Control Sense: 0 ~ 5) ★

⑩ Tune (Tune: 438Hz ~ 445Hz) ★

⑪ Pitch 1 (Pitch 1: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑫ Pitch 2 (Pitch 2: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑬ Fine1 (Pitch Fine 1: -100 ~ +100)

⑭ Fine2 (Pitch Fine 2: -100 ~ +100)

⑮ Delay1 (Delay Time 1: 0.1msec ~ 650.0msec)

⑯ Delay2 (Delay Time 2: 0.1msec ~ 650.0msec)

⑰ Fb1Gain (Feed Back 1 Gain: -99% ~ +99%)

⑱ Fb2Gain (Feed Back 2 Gain: -99% ~ +99%)

- ⑱ Level1 (Level 1: 0% ~ 100%)
- ⑲ Level2 (Level 2: 0% ~ 100%)
Sets the parameters same as "MonoPit" effect for Pitch 1 and Pitch2.

⑳ Pan1 (Pan 1: 100/0-0/100)

㉑ Pan2(Pan2: 100/0~0/100)

Sets the parameters for Pitch 1 and Pitch2 individually. A setting of 100/0 positions the sound to the left. A setting of 0/100 positions the sound to the right and 50/50 positions the sound in the center.

㉒ Base Key (Base Key: OFF, C1 ~ C6) ★

This is the same as "MonoPit" effect.

NOTE: Refer to the "MonoPit" effect on P.39 for the definitions of parameters.

⑫ Pitch 1 (Pitch 1: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑬ Pitch2 (Pitch 2: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑭ Pitch3 (Pitch 3: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑮ Fine1 (Pitch Fine 1: -100 ~ +100)

⑯ Fine2 (Pitch Fine 2: -100 ~ +100)

⑰ Fine3 (Pitch Fine 3: -100 ~ +100)

⑱ Delay1 (Delay Time 1: 0.1msec ~ 1400msec)

⑲ Delay2 (Delay Time 2: 0.1msec ~ 1400msec)

⑳ Delay3 (Delay Time 3: 0.1msec ~ 1400msec)

㉑ Level1 (Level 1: 0% ~ 100%)

㉒ Level2 (Level 2: 0% ~ 100%)

㉓ Level3 (Level 3: 0% ~ 100%)

㉔ Pan1 (Pan 1: 100/0 ~ 0/100)

㉕ Pan2 (Pan 2: 100/0 ~ 0/100)

㉖ Pan3(Pan 3: 100/0-0/100)

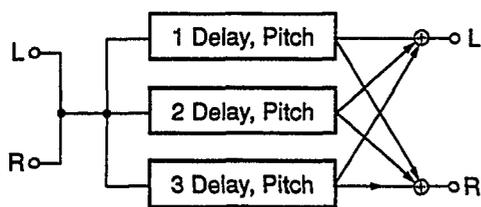
Sets the same parameter as "MonoPit" and "DualPit" effect for Pitch1, Pitch2 and Pitch3.

㉗ Base Key (Base Key: OFF, C1 ~ C6) ★

NOTE: Refer to the "MonoPit" effect on P. 39 and "DualPit" effect on P. 40 for the definitions of parameters.

Triple Pitch Change (TripPit)	1in/2out
-------------------------------	----------

This effect produces three independent pitch-shifted notes in addition to the original note, making it possible to produce automatic four part harmonies. There is no feedback here.



Parameters

① Intelli (Intelligent: ON, OFF)

The switch for ON/OFF function of the Intelligent.

A setting at ON will display the Intelligent function screen of

② ~ ⑪ and ⑮ ~ ⑳. A setting at OFF will display the

Chromatic Pitch Change screen of ⑫ ~ ㉗.

② Key (Key: C ~ B) ★

③ Scale (Scale Type) ★

④ InNote (Incut Note: Tonic ~ 7th) ★

⑤ Pitch1 (Pitch 1: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑥ Pitch2 (Pitch 2: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑦ Pitch3 (Pitch 3: ↓ ↓ Oct~ ↑ ↑ Oct) ★

⑧ Save To (User-Scale: 1, 2)

⑨ Source (Control Source: Signal, MIDI) ★

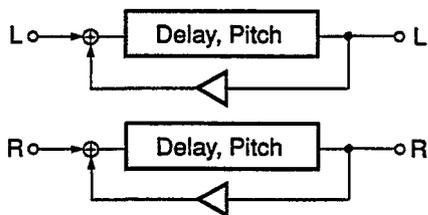
⑩ Sense (Control Sense: 0 ~ 5) ★

⑪ Tune (Tune: 438Hz ~ 445Hz) ★

Stereo Pitch Change (StPitch)

2in/2out

The Stereo Pitch Change program produces a smooth pitch shift effect rather than an abrupt shift from note to note. The parameters affect both the left and right channels simultaneously.

**Parameters**

- ① Pitch (Pitch: $\downarrow \downarrow$ Oct ~ $\uparrow \uparrow$ Oct) ★
Determines the musical interval between the pitch change sound and original sound. This musical interval can become the pitch change sound when feedback is applied.
- ② Fine (Pitch Fine: -100 ~ +100)
Permit fine tuning of the pitch shifted note in 1-cent steps (1/100 pitch).
- ③ Delay (Delay Time: 0.1msec ~ 650.0msec)
Determine the time delay between input of the original note and output of the pitch shifted note.
- ④ FbGain (Feed Back Gain: -99% ~ +99%)
Determines the amount of pitch change to be fed back into the input of the processor.
When this parameter is set to 0, only a single pitch shifted sound is produced after the delay time has elapsed. As the value of this parameter is increased, more and more delayed repeats are produced.
- ⑤ Base Key (Base Key: OFF, C1 ~ C6) ★
Same as the "MonoPit" effect.

NOTE: During the MIDI NOTE ON message, the NOTE ON signal controls the Pitch change.

NOTE: The pitch is changed gradually and smoothly during STEREO PITCH CHANGE.

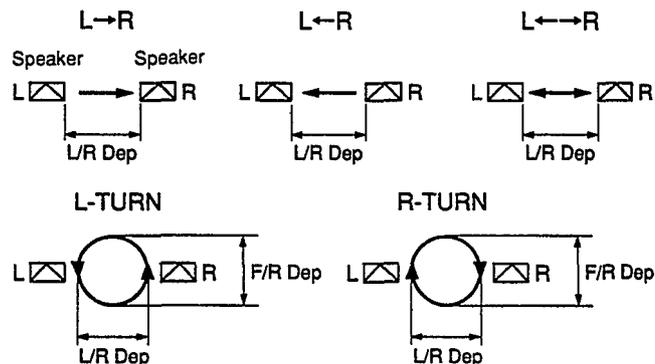
PAN EFFECTS**Auto Pan (AutoPan)**

1in/2out

This is a very sophisticated pan program that allows creation of "rotary" pan in addition to straightforward pan effect.

Parameters

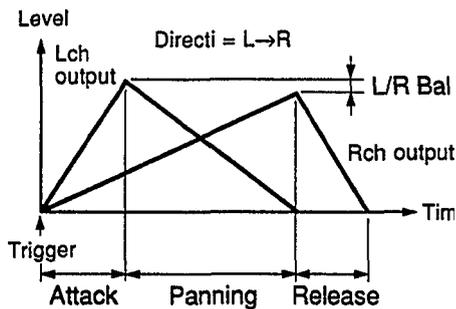
- ① Type (Pan Type: $L \rightarrow R$, $L \leftarrow R$, $L \leftrightarrow R$, L-TURN, R-TURN)
Determines the direction in which the sound sweeps across the stereo sound field. The L-TURN and R-TURN parameters produce a pan which seems to rotate toward and away from the listener in the specified direction.



- ② Speed (Speed: 0.05Hz ~ 40.0Hz)
Sets the speed of the PAN effect (i.e. how rapidly the signal sweeps from channel to channel).
- ③ F/R Dep (Front/Rear Depth: 0% ~ 100%)
When the L-TURN or R-TURN pan type is selected, this parameter sets the apparent depth of the sweep from front to rear.
- ④ L/R Dep (Lch/Rch Depth: 0% ~ 100%)
Sets the "depth" of the pan sweep from left to right and right to left.
- ⑤ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)
Permits the rolling off the low frequency content of the signal above the set frequency. The HPF is OFF when set to THRU.
- ⑥ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)
Permits the rolling off the high frequency content of the signal above the set frequency. The LPF is OFF when set to THRU.

Triggered Pan (TrigPan)

1in/2out



When triggered, this program automatically pans the sound image between left and right in the stereo sound field ~ with programmable attack, pan and release rates.

- Receives the MIDI NOTE ON message
- Press the footswitch which is connected to the Trigger Terminal

Parameters

- ① TrgLvl (Trigger Level: 1 ~ 100)
Determines the level of the input signal required to trigger the panning effect. At 100% only very high level input signals will trigger the pan, while at 0% even the tiniest input signal will trigger the pan.
- ② TrgDly (Trigger Delay Time: -100msec ~ +100msec)
The time taken when the effect is triggered to the time when signal is outputed. If a minus value is programmed, the input signal is delayed so that, effectively, the effect begins before the signal appears.
- ③ TrgMsk (Trigger Mask: 3msec ~ 24000msec)
This parameter makes it impossible to re-trigger the effect until the programmed time has elapsed.
- ④ Attack (Attack Time: 3msec ~ 24000msec)
Determines how rapidly the panning effect begins.
- ⑤ Panning (Panning Time: 3msec ~ 24000msec)
Determines how long it takes to complete the main portion of the pan.
- ⑥ Release (Release Time: 3msec ~ 24000msec)
Determines the release time of the end of the pan.
- ⑦ Directi (Direction: L → R, L ← R)
Determines the direction in which the sound sweeps across the stereo sound field.
- ⑧ L/R Bal (Lch/Rch Balance: 0% ~ 100%)
Determines the maximum extent of the pan sweep. For example, a setting of 100% produce a full pan from the extreme left and vice verse.

⑨ MidiTrg (MIDI Trigger: OFF, ON) ★

When this parameter is turned ON, a MIDI NOTE ON message from an external MIDI keyboard can be used to trigger the pan,

⑩ HPF (High Pass Filter Frequency: THRU, 32Hz ~ 1.0kHz)

Permits the rolling off the low frequency content of the signal above the set frequency. The HPF is OFF when set to THRU.

⑪ LPF (Low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

Permits the rolling off the high frequency content of the signal above the set frequency. The LPF is OFF when set to THRU.

MULTI-EFFECTS

The SPX990 multi-effect combine compressor, distortion, equalizer or dynamic filter, reverb and chorus effects and this section attempts to explain how the various effects are connected.

Chorus & Reverb (Cho&Rev)

1in/2out

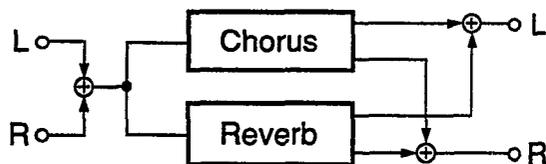
This is the multi-effect program of the Stereo Chorus and Stereo Reverb.

Parameters

① Direction (Effect Direction: Chorus+Reverb, Chorus → Reverb, Reverb → Chorus)

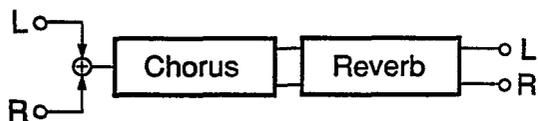
• Chorus+Reverb

Mixed output between the left and right channel of signal output of the Stereo Chorus and signal output of the Stereo Reverb.



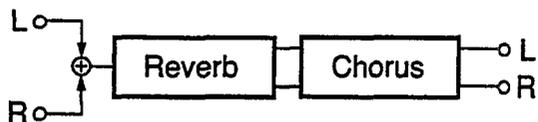
• Chorus → Reverb

Input signal enters the Chorus first and then the Reverb program.



• Reverb → Chorus

Input signal enters the Reverb first and the Chorus program.



- ② ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)
- ③ DM.Dep (Delay Time Modulation Depth: 0% ~ 100%)
- ④ AM.Dep (Amplitude Modulation Depth: 0% ~ 100%)
Refer to "FM Cho" effect on page 38.

⑤ RevTime (Reverb Time: 0.3sec ~ 480.0sec)

⑥ HiRatio (High Ratio: RevTime x0.1 ~ x1.0)

⑦ IniDly (Initial Delay Time: 0.1msec ~ 800.0msec)
Refer to "Reverb" effect on page 25.

⑧ RevMix (Reverb Mixing Balance: 0% ~ 100%)
Determines the mix between the signal entering the reverb processor and the reverb sound. A bigger value causes more reverb sound.

⑨ TrgLvl (Trigger Level: 0% ~ 100%)

⑩ Release (Release Time: 3msec ~ 24000msec)

⑪ MidiTrg (MIDI Trigger: ON, OFF) ★
Refer to "Reverb" effect on page 25.

Symphonic & Reverb (Sym&Rev)

1in/2out

This is the multi-effect program of the Stereo Symphonic and Stereo Reverb.

Parameters

① Direction (Effect Direction: Sympho+Reverb, Sympho → Reverb, Reverb→ Sympho)
Refer to "Cho&Rev" effect.

② ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)

③ Depth (Modulation Depth: 0% ~ 100%)
Refer to "Symphon" effect on page 38.

④ RevTime (Reverb Time: 0.3sec ~ 480.0sec)

⑤ HiRatio (High Ratio: RevTime x0.1 ~ x1.0)

⑥ IniDly (Initial Delay Time: 0.1msec ~ 800.0msec)
Refer to "Reverb" effect on page 25.

⑦ RevMix (Reverb Mixing Balance: 0% ~ 100%)
Determines the balance between the direct and effect sound. higher values produce a greater proportion of the effect sound in relation to the direct sound.

⑧ TrgLvl (Trigger Level: 0% ~ 100%)

⑨ Release (Release Time: 3msec ~ 24000msec)

⑩ MidiTrg (MIDI Trigger: ON, OFF) ★
Refer to "Reverb" effect on page 25

Flanger & Reverb (Flg&Rev)

1in/2out

This is the multi-effect program of the Stereo Flanger and Stereo Reverb.

Parameters

- ① Direction (Effect Direction: Flange+Reverb, Flange → Reverb, Reverb → Flange)

Refer to "Cho&Rev" effect on page 44.

- ② ModFrq (Modulation Frequency: 0.05Hz ~ 40.0Hz)

- ③ Depth (Modulation Depth: 0% ~ 100%)

- ④ Delay (Delay Time: 0.1msec ~ 20.0msec)

- ⑤ FbGain (Feed Back Gain: 0% ~ 99%)

Refer to "Flanger" effect on page 37.

- ⑥ RevTime (Reverb Time: 0.3sec ~ 480.0sec)

- ⑦ HiRatio (High Ratio: RevTime x0.21 ~ x1.0)

- ⑧ IniDly (Initial Delay Time: 0.1msec ~ 800.0msec)

Refer to "Reverb" effect on page 25.

- ⑨ RevMix (Reverb Mixing Balance: 0% ~ 100%)

Determines the mix balance between the signal entering the reverb processor and the reverb sound.

- ⑩ TrgLvl (Trigger Level: 0% ~ 100%)

- ⑪ Release (Release Time: 3msec ~ 24000msec)

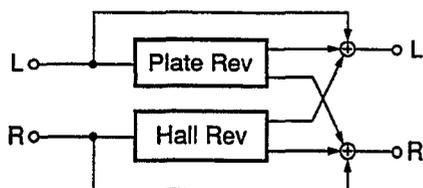
- ⑫ MidiTrg (MIDI Trigger: ON, OFF) ★

Refer to "Reverb" effect on page 25.

Reverb(L)/ Reverb(R) (Rev/Rev)

2in/2out

This is the dual effect program in which the signal input on the left channel is delivered in Plate Rev. and the signal input on the right channel is delivered in the Hall Rev.

**Parameters**

NOTE: Balan1 is the mix level of Plate

Balan2 is the mix level of Hall

- ① PltRvT (Plate Reverb Time: 0.3sec ~ 480.0sec)

Set the left channel reverb time of Plate.

- ② PltHiR (Plate Reverb High Ratio: PltRvt x0.1 ~ x1.0)

Allows the alteration of the high frequency plate reverb times in relation to the overall reverb time.

- ③ PltDif (Plate Reverb Diffusion: 0 ~ 10)

Sets the complexity of the many reflection that makes up reverberation.

- ④ PltDly (Plate Reverb Delay Time: 0.1msec ~ 200msec)

The time taken for the plate reverb sound to occur.

- ⑤ HalRvT (Hall Reverb Time: 0.3sec ~ 480.0sec)

Set the right channel reverb time of the Hall.

- ⑥ HalHiR (Hall Reverb High Ratio: HalRvt x0.1 ~ x1.0)

Allows the alteration of the high frequency HALL reverb times in relation to the overall reverb time.

- ⑦ HalDif (Hall Reverb Diffusion: 0 ~ 10)

Sets the complexity of the many reflection that makes up reverberation.

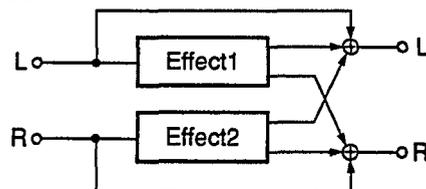
- ⑧ HalDly (Hall Reverb Delay Time: 0.1msec ~ 200msec)

The time taken for the Hall reverb sound to occur.

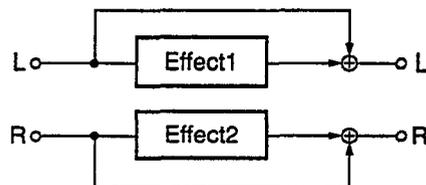
- ⑨ Output (Output Mode: Stereo, Monox2)

When set to Stereo, the output of the left and right channel processors are mixed and the output signal is delivered in stereo. When monox2 is selected, the left and right channel processors are completely independently.

- Stereo



- Monox2



- ⑩ PltLpF (Plate Reverb low Pass Filter Frequency: 1.0kHz ~ 16kHz, THRU)

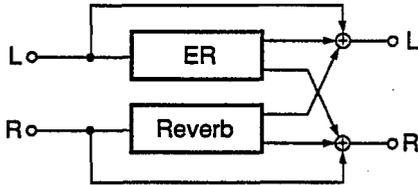
Permits rolling off the high frequency content of the PLATE signal above the set frequency. The LpF is OFF when set to THRU.

- ⑪ HalLpF (Hall Reverb Low Pass Filter Frequency; 1.0kHz ~ 16kHz, THRU)

Permits rolling off the high frequency content of the HALL signal above the set frequency. The LpF is OFF when set to THRU.

ER (L)/Reverb (R) (ER/Rev)**2in/2out**

This is the dual effect program in which the signal input on the left channel is delivered in ER and the signal input on the right channel is delivered in Reverb.

**Parameters**

NOTE: Balan1 is the mix level of ER.

Balan2 is the mix level of Reverb.

- ① ErType (Early Reflection Type: S-Hall, L-Hall, Random, Reverse, Plate, Spring)
Select among the early reflection pattern.
- ② Room (ER Room Size: 0.1 ~ 25.0)
Sets the separation between reflections and effect on the room size.
- ③ Live (ER Liveness: 0 ~ 10)
Determines how the early reflections decay.
- ④ Diffuse (ER Diffusion: 0 ~ 10)
Sets the complexity of many reflections that make up the reverberation.
- ⑤ ErDly (E Initial Delay Time: 0.1msec ~ 300.0msec)
The time delay between the direct sound and the first of the many reflections that make up reverberation.

Inputs on the left channel above are the ER parameters. The inputs on the right channel from ⑥ ~ ⑨ are the Reverb parameters.

- ⑥ RevTime (Reverb Time: 0.3sec ~ 480.0sec)
Sets the time of the reverb sound.
- ⑦ HiRatio (REVERB High Ratio: RevTime x0.1 ~ x1.0)
Allows alteration of the high frequency reverb times in relation to the overall reverb time.
- ⑧ Diffuse (REVERB Diffusion: 0 ~ 10)
Sets the complexity of many reflections that make up the reverberation.
- ⑨ RevDly (REVERB Initial Delay Time: 0.1msec ~ 300.0msec)
The time delay between the direct sound and the first of the many reflections that make up the reverberation.

⑩ Output (Output Mode: Stereo, Monox2)

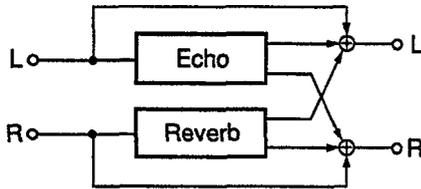
When set to stereo, the output of the left and right-channel processors are mixed and the output signal is delivered in stereo. When MONOX2 is selected, the left and right-channel processors are completely independent. Refer to "Rev/Rev" effect on page 45.

⑪ RevLPF (REVERB Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)

Permits rolling off the high-frequency content of the REV signal above the set frequency. The LPF is OFF when set to THRU.

Echo (L) Reverb (R) (Ech/Rev) 2in/2out

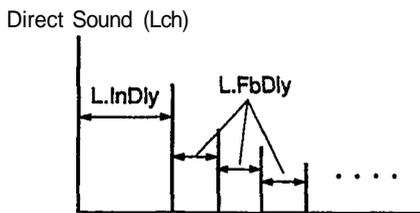
This is the dual effect program in which the signal input on the left channel is delivered in Echo sound and the signal input on the right channel is delivered in Reverb.



Parameters

NOTE: Balan1 is the mix level of Echo
 Balan2 is the mix level of Reverb

- ① LFBdly (ECHO Lch Delay Time: 0.1msec ~ 350.0msec)
 After the initial delay is produced, the time between subsequent repeats is determined by the left channel.

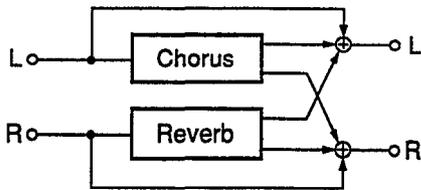


- ② L. Fb (ECHO Lch Feed Back Gain: -99% ~ +99%)
 Sets the left channel delay signal fed back to the input of the processor.
- ③ R.FbDly (ECHO Rch Feed Back Gain: 0.1msec ~ 350.0msec)
- ④ R.Fb (ECHO Rch Feed back Gain: -99% ~ +99%)
 Sets at the right channel.
- ⑤ High (ECHO High Frequency Feed Back Gain: x0.1 ~ x1.0)
 Controls feedback in the high frequency range on both the left and right channel.
- ⑥ RevTime (Reverb Time: 0.3sec ~ 480.0sec)
 Sets the time of reverb sound in the right channel.
- ⑦ HiRatio (REVERB High Ratio: RevTime x0.1 ~ x1.0)
 Allows the alteration of high frequency reverb time in relation to the overall reverb time.
- ⑧ Diffuse (REVERB Diffusion: 0-10)
 Sets the complexity of many reflections that make up the reverberation.

- ⑨ RevDly (REVERB Initial Delay Time: 0.1msec ~ 200msec)
 This is the time taken for the reverb sound occurs.
- ⑩ Output (Output Mode: STEREO, Monox2)
 When set to stereo, the outputs of the left and right-channel processors are mixed and the output signal is delivered in stereo. When MONOX2 is selected, the left and right-channel processors are completely independent. Refer to "Rev/Rev" effect on page 45.
- ⑪ LInDly (ECHO Lch Initial Delay Time: 0.1msec ~ 350.0msec)
 The time delay between the input from the left channel and the initial echo output sound from the left channel.
- ⑫ R.IniDly (ECHO Rch Initial Delay Time: 0.1msec ~ 350.0msec)
 The time delay between the input from the right channel and the first echo output sound from the right channel.
- ⑬ RevLPF (REVERB Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)
 Sets the cutoff frequency of the low pass filter. The LPF is OFF when set to THRU.

Chorus(L)/ Reverb(R) (Cho/Rev)**2in/2out**

This is the dual effect program in which the signal input on the left channel is delivered in Chorus and the signal input on the right channel is delivered in Reverb.

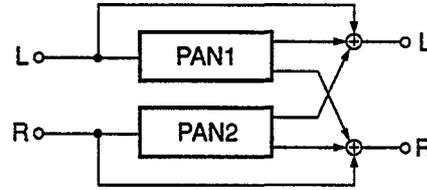
**Parameters**

NOTE: Balan1 is the mix level of Chorus
Balan2 is the mix level of Reverb

- ① ModFrq (CHORUS Modulation Frequency: 0.05Hz ~ 40.0Hz)
Sets the speed of modulation and hence the rate at which the effect varies.
- ② DM.Dep (CHORUS Delay Time Modulation Depth: 0% - 100%)
Sets the amount of chorus width of the shaking between L and R channels.
- ③ AM.Dep (CHORUS Amplitude Modulation Depth: 0% ~ 100%)
Sets the amount of the width of the chorus amplitude variation.
- ④ RevTime (Reverb Time: 0.3sec ~ 480.0sec)
Sets the time of reverb sound on the right channel.
- ⑤ HiRatio (REVERB High Ratio: RevTime x0.1 ~ x1.0)
Allows the alteration of high frequency reverb times in relation to the overall reverb time.
- ⑥ Diffuse (REVERB Diffusion: 0-10)
Sets the complexity of many reflections that make up reverberation.
- ⑦ RevDly (REVERB Initial Delay Time: 0.1msec ~ 300.0msec)
Sets the delay time until the initial reverb sound occurs.
- ⑧ Output (Output Mode: Stereo, Monox2)
When set to stereo, the output on the left and right channels are mixed and the output signal is delivered in as stereo.
When Monox2, is selected, the left and right channel processors are completely independent.
Refer to "Rev/Rev" effect on page 45.
- ⑨ RevLPF (REVERB Low Pass Filter Frequency: 1kHz ~ 16kHz, THRU)
Sets the cutoff frequency of the low pass filler. The LPF is OFF when set at THRU.

Pan(L)/Pan(R) (Pan/Pan)**2in/2out**

This is the effect program in which the signal inputs on both the left and right channels are delivered in PAN1 and PAN2 independently.

**Parameters**

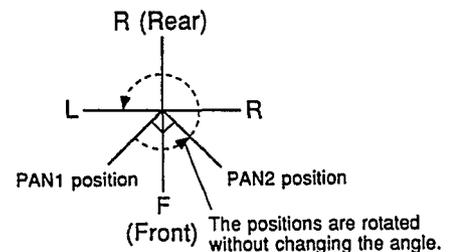
NOTE: Balan1 is the mix level of PAN1 (Lch)
Balan2 is the mix level of PAN2 (Rch)

- ① Type1 (1 Pan Type: L → R, L ← R, L ↔ R, L-TURN, R-TURN)
 - ② Speed1 (1 Panning Speed: 0.05Hz ~ 40.0Hz)
 - ③ F/R Dep1 (1 Front/Rear Depth: 0% ~ 100%)
 - ④ L/R Dep1 (1 Lch/Rch Depth: 0% ~ 100%)
 - ⑤ Delay1 (1 Initial Delay Time: 0.1msec ~ 700.0msec)
The above are parameters for PAN1.
 - ⑥ Type2 (2 Pan Type: L → R, L ← R, L ↔ R, L-TURN, R-TURN)
 - ⑦ Speed2 (2 Panning Speed: 0.05Hz ~ 40.00Hz)
 - ⑧ F/R Dep2 (2 Front/Rear Depth: 0% ~ 100%)
 - ⑨ L/R Dep2 (2 Lch/Rch Depth: 0% ~ 100%)
 - ⑩ Delay2 (2 Initial Delay Time: 0.1msec ~ 700.0msec)
The above are parameters for PAN2.
- The definitions for the each Pan parameters are the same as Pan program. 2 signal inputs create two sets of Pan.

- ⑪ Phase (Phase: -180.0deg ~ +180.0deg)

Determines the starting phase of the 2-channel pan (PAN2) in relation to the left-channel pan (PAN1).

Sets the angle of rotation between PAN1 and PAN2 positions.
For e.g. if the angle between PAN1 and PAN2 is 90°, their positions are moved without changing the angle.



FREEZE EFFECT

Freeze (Freeze)

1in/2out

The FREEZE programs allow sampling (digital recording) and playback of sounds received at the SPX990's inputs. The freeze program permits mono-sampling for a maximum of 1.35seconds allows playback start and end functions. The freeze program, like the pitch change program, can change the pitch signal and playback the data.

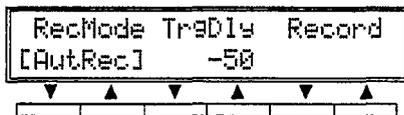
NOTE: When the power supply is at OFF, the recorded sound will be gone.

NOTE: When other program are recalled, the recorded sound will also be gone.

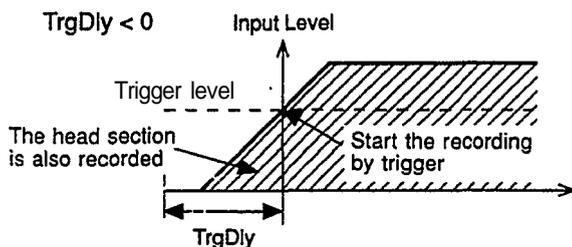
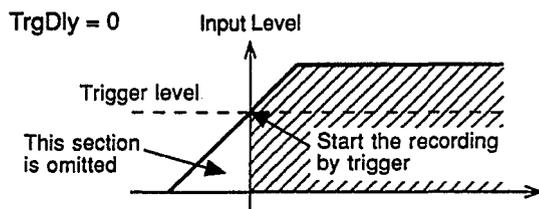
NOTE: When the input mode is at STEREO, the recorded signal is inputted into the left channel.

OVER DUBBING

Press the PAGE Select \triangle and ∇ keys to display the following keys.



- **TrgDly (Trigger Delay Time: -1350msec ~ +1000msec)**
This parameter sets a delay between triggering and actual initiation of the sampling process. If TrgDly=0, trigger becomes effective and at the same time, recording begins. If a negative value is specified, input signals are temporarily stored and the sound is sampled from the specified time before the trigger occurs. A small negative value is still be effective especially for AutRec. and Autovr.



- **RecMode (Recording Mode) ★**

Selects the recording mode.

- **ManRec (Manual Recording)**

Record manually the triggering effect.

The following methods will cause trigger effect:

1. Press the Function key under the display "Record" on the display.
2. Press the footswitch which is connected to the Trigger terminal.

When sampling is in progress, "-----" will appear under "Record" and when sampling is completed, "OK" will be displayed.

Any previous data in the freeze memory is erased when the record function is executed.

- **ManOvr (Manual Over Dubbing)**

Over Dubbing manually the triggering effect.

The over dubbing function is used to record a new sound over a previously recorded sound.

- **AutRec (Auto Recording)**

When the input signal exceeds the set level, the trigger is recorded automatically.

NOTE: When TrgDly < 0, the previous data in the freeze memory will still be stored. When TrgDly > 0, sampling of new sound will start.

When sampling is in progress, "-----" will appear under "Record" on the display and when sampling is completed, "OK" will be displayed. Any previous data in the freeze memory will be erased when the record function is executed.

- **Autovr (Auto Over Dubbing)**

Over dubbing automatically the triggering effect.

The over dubbing function is used to record a new sound over a previously recorded sound.

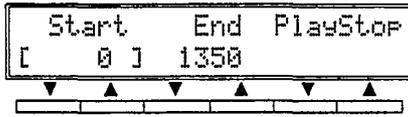
PLAYBACK

Press the PAGE Select \triangle and ∇ keys to playback any screen you want.

The following procedure shows the playback and stop operations;

1. Press the any function ∇ or \triangle key under the display "PlayStop".
2. Press the footswitch which is connected to the Trigger terminal.
3. Playback the data by MIDI NOTE ON function and stop transmission by NOTE OFF function.

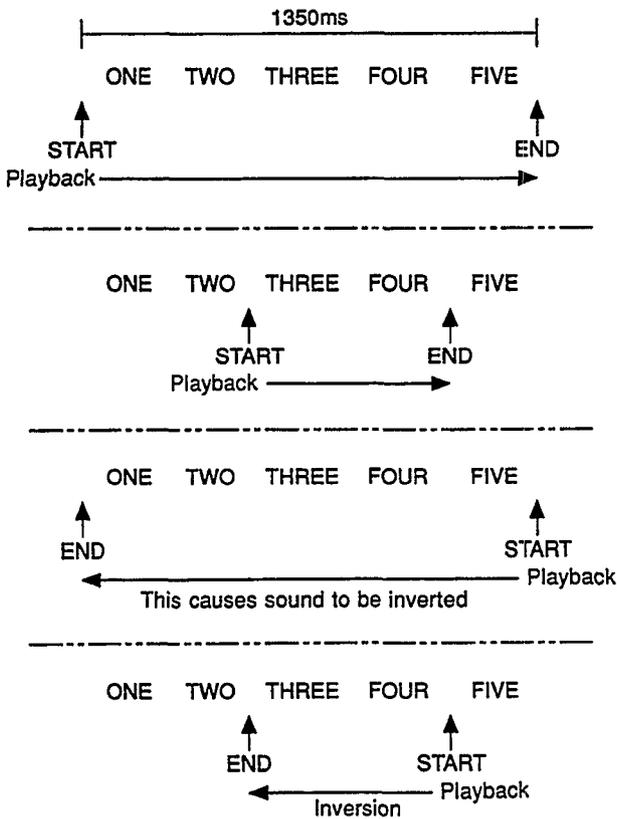
Playback START/END Points



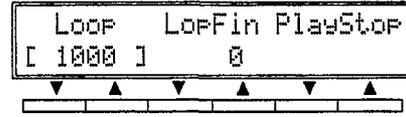
- Start (Start Point: 0msec ~ 1350msec)
- END (End Point: 0msec ~ 1350msec)

The parameters determine at what point playback will begin or end when a trigger occurs. If the END point is set to a time earlier than the START point, the sampled sound will be reversely played back.

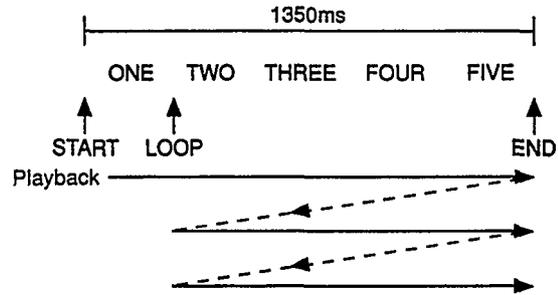
When sampling "ONE TWO THREE FOUR FIVE" of a human voice.



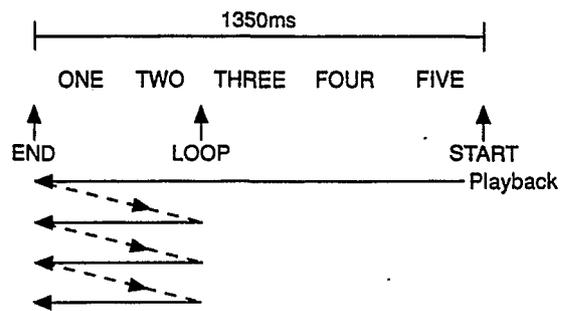
Playback Loop Point



- Loop (Loop Point: 0msec ~ 1350msec)
- LopFin (Loop Fine: -200 ~ +200)



This parameter sets the end point of the sampled sound, but the sampled sound will therefore play continuously as long as the trigger is held ON. The LOOP FINE parameter allows fine adjustment of the LOOP end point, making it possible to create the smoothest transition between the LOOP and START points.



Changing of Pitch During Playback

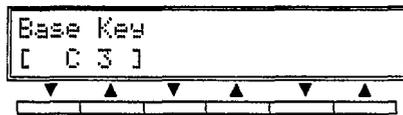
Changing of Pitch



- Pitch (Pitch: ↓ ↓ Oct ~ ↑ ↑ Oct) ★
- Fine (Pitch Fine: -100 ~ +100)

The playback pitch can be changed same as the PITCH effect. PITCH can be varied from two octaves below and above the original pitch of the sampled sound. PITCH FINE permits fine tuning of the playback pitch in one-cent increments. (a cent is 1/100th of a semitone).

Changing of Pitch by MIDI



- Base Key (Base Key: OFF, C1 ~ C6) ★
- When the MIDI NOTE ON message appears, the value of pitch can be changed. (Refer to "MonoPit")
- When the MIDI NOTE OFF message appears, the playback will stop.

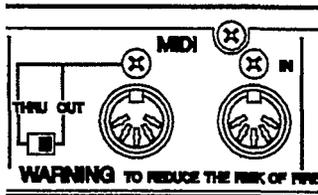
MIDI CONTROL

The SPX990 is installed with MIDI terminal to be connected with the external MIDI devices for several controls and functions. "Musical Instrument Digital Interface", MIDI is the signal format for digital instruments, sound control and parameters information.

- To operate the MIDI control, connect MIDI terminal with the external MIDI devices.

MIDI TERMINAL

SPX 990 Terminal



MIDI IN

A terminal to input MIDI information from external MIDI devices. Connect to the MIDI OUT or THRU terminal of a MIDI device.

MIDI OUT/THRU

It is a terminal to set either MIDI THRU or MIDI OUT.

MIDI OUT

A terminal to output MIDI information to external devices. Connected to the MIDI IN terminal of a MIDI device.

MIDI THRU

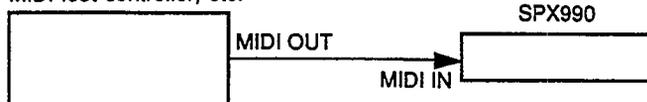
A terminal to output unchanged signals received at the MIDI IN terminal. This is used to send a signal received from an outside device to another device.

MIDI OPERATIONS

■ Changing of Program (Recalling a program)

The SPX990 can change a program (i.e. recall a program) when MIDI program change message is received from external MIDI devices. When you change timbre in the MIDI keyboard, for instance, the program in the SPX990 will be changed at the same time,

MIDI keyboard, sequencer
MIDI foot controller, etc.



- Decide the value of SPX990 memory No. (U01 ~ U99, U100, C01 ~ C99, C00, ---, P01-P80) for each program change No. (PGM1 ~ 128). (see "MIDI PROGRAM CHANGE TABLE SETUP" on Page 55)
- Set the desired bank. (see "MIDI PROGRAM CHANGE TABLE SETUP" on Page 55)
- If you want to control the other MIDI devices at the same time through the Program Change Message sent from external devices, connect the devices to the MIDI OUT/THRU terminal of SPX990 and switch MIDI OUT/THRU to the "THRU" position.

When using the MIDI OUT/THRU terminal, other external MIDI devices can also be controlled.

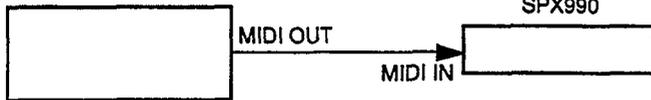
Preset Operation:

- Adjust MIDI transmission channel of external devices to the SPX990 MIDI receiving channel of banks, (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55)

■ PARAMETER CONTROL

You can change the parameter of a program any time by sending message such as control change from the external devices. For instance, you can change the parameter of SPX990 by operating data entry keys.

MIDI keyboard, sequencer
MIDI foot controller, etc.



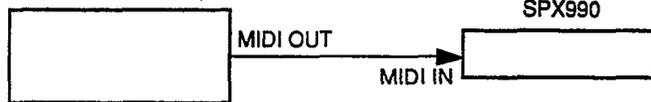
Preset Operation:

- Choose a controller among the followings, (see "1. Controller Assign" on page 56.)
 - Any of Control Change Message
 - Note No. or velocity of Note On Message
 - Channel Pressure
- Specify the parameter to be controlled for each program, (see "2. Parameter Assign" on page 57.)
- Adjust MIDI transmission channel of external devices to the SPX990 MIDI receiving channel of banks, (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Recall the program to be controlled.

■ MIDI TRIGGER

You can produce a trigger (open the gate) by sending Note On Message from external devices when the Main Effect is Reverb, FiltRev, EchRoom and TrigPan programs. For instance, the effect works as soon as the sound comes out when pressing keys in the MIDI keyboard.

MIDI keyboard, sequencer
MIDI foot controller, etc.



Preset Operation:

- Adjust MIDI transmission channel of external devices to the SPX990 MIDI receiving channel of banks. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Recall the program and set the MIDI TRG parameter "ON".

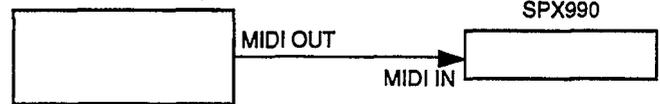
■ PITCH CONTROL

You can control the musical interval of the pitch change and the playback pitch of freeze by sending Note On Message from external devices for the following types of effects.

- MonoPit (Intelligent: OFF)
- DualPit (Intelligent: OFF)
- TripPit (Intelligent: OFF)
- StPitch
- Freeze

When you press the keys in the MIDI keyboard, for instance, the musical interval of the pitch and the playback pitch of freeze in the SPX990 will be changed at the same time.

MIDI keyboard, sequencer
MIDI foot controller, etc.



Preset Operation:

- Adjust MIDI transmission channel of external devices to the SPX990 MIDI receiving channel of banks. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Recall the program and set the "Intelli" parameter "OFF" and the parameter of "BaseKey".

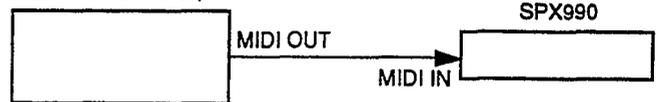
■ PITCH CONTROL (INTELLIGENT : ON)

You can control the musical interval or the intelligent pitch change sound by sending Note On Message from external devices for the following types of main effects:

- MonoPit
- DualPit
- TripPit

When you press the keys in the MIDI keyboard, for instance, the musical interval of the intelligent pitch in the SPX990 will be changed at the same time.

MIDI keyboard, sequencer
MIDI foot controller, etc.



Preset Operation:

- Adjust MIDI transmission channel of external devices to the SPX990 MIDI receiving channel of banks. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Recall the program and at the same time, set the "Intelli" parameter "ON" and the "Trig." parameter to "MIDI".

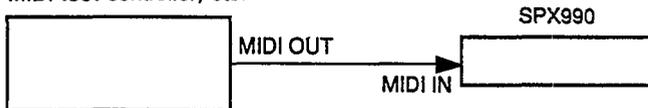
■ TEMPO CONTROL

In case the main effect is the following type, you can control the "Tempo" parameter by sending MIDI CLOCK from external devices.

- TmpEch1
- TmpEch2
- TmpEch4

You can control delay time according to the tempo of the playing music, for instance, in the MIDI sequencer.

MIDI keyboard, sequencer
MIDI foot controller, etc.

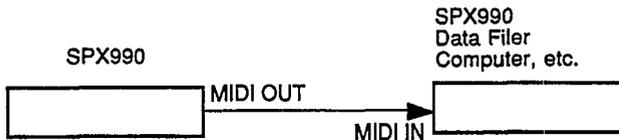


Preset Operation:

- Set the any value to the SPX990 MIDI receiving channel of banks except for OFF. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Recall the program and set "Trig." parameter to "MIDI".

■ BULK OUT

You can stock the same data in another SPX990, MIDI data filer or computer by bulking out the data using the key operations of SPX990.

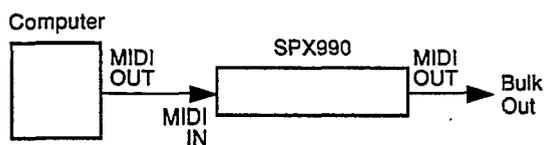


Preset Operation:

- Adjust MIDI transmission channel of the SPX990 (MIDI channel of the present bank) with the MIDI receiving channel of another SPX990, etc. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)
- Specify the contents to be bulked out.(see "MIDI BULK OUT" on Page 58.)

■ RECEIVING BULK DUMP REQUEST

You can bulk out data of SPX990 by sending message of bulk dump request from external computer.

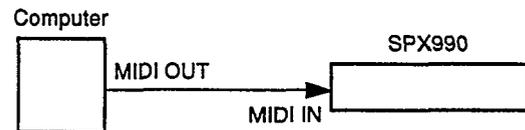


Preset Operation:

- Adjust MIDI transmission and receiving channel of the SPX990 (MIDI channel of the present bank) with the MIDI transmission channel of the computer and MIDI receiving channel of devices which receives the contents of bulk dump. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)

■ BANK CHANGE REQUEST

You can change the bank of SPX990 by sending message of bank change request from external computer (by using system exclusive message same as bulk dump). That is, you can control bank change by external devices.

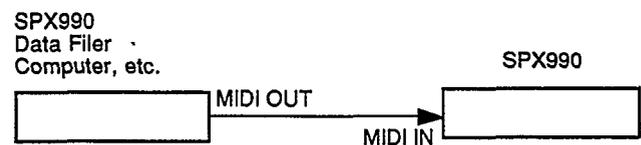


Preset Operation:

- Adjust MIDI receiving channel of the SPX990 (MIDI channel of the present bank) with the MIDI transmission channel of the computer. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)

■ BULK IN

You can bulk in data of another SPX990, MIDI data filer or computer, etc.



Preset Operation

- Set the memory protect of SPX990's at OFF. (See "SELECTING USER MEMORY PROTECT MODE" on Page 17.)
- Adjust MIDI receiving channel of the SPX990 (MIDI channel of the present bank) with the MIDI transmission channel of another SPX990, etc. (see "MIDI PROGRAM CHANGE TABLE SETUP" on page 55.)

NOTE: When the bulk data are received, the No. will be changed to that specified on the transmission side.

■ ON MIDI INDICATOR

When the MIDI data are received, MIDI indicator on the front panel will light up.

MIDI PROGRAM CHANGE TABLE SETUP (Edit Mode: Page 3 menu)

For the 4 banks from A~D, it is possible to set MIDI transmission channel and program change table. Set the channel No. on "?" and the program memory No. freely.

BANK: A ch= ?		BANK: B ch= ?	
MIDI-PGM	SPX-MEM	MIDI-PGM	SPX-MEM
1	= ?	1	= ?
2	= ?	2	= ?
3	= ?	3	= ?
128	= ?	128	= ?
BANK: G ch= ?		BANK: D ch= ?	
MIDI-PGM	SPX-MEM	MIDI-PGM	SPX-MEM
1	= ?	1	= ?
2	= ?	2	= ?
3	= ?	3	= ?
128	= ?	128	= ?

↑

Program Change No.
from keyboard

↑

SPX990 Program
Memory No.

Procedure

- Press the EDIT key to get the edit mode and use the Page Select \triangle and ∇ keys to display the Page 3 of the edit mode



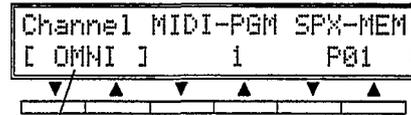
- Press any function ∇ or \triangle key under the display "PGMtbl" on the LCD to display the program change table bank.



- Select Bank A, B, C or D under the display "Bank".

NOTE: If you want to change the bank only do step ③ after the above operation. The currently selected bank is not changed if you do not change to another bank.

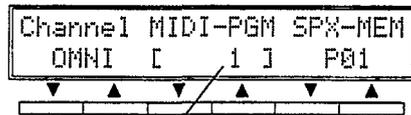
- Press the PAGE Select \triangle key to go to the next display. Then press the function ∇ and \triangle keys under the display "Channel" and the selected bank will be specified in the MIDI transmitting and receiving channel.



MIDI transmitting/receiving Channels:

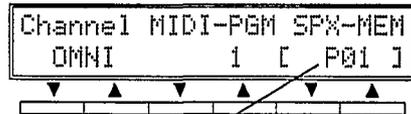
- OMNI All channels can be received.
Transmission on channel 1.
- 1 Message on channel 1 can be transmitted/received.
- 2 Message on channel 2 can be transmitted/received.
- ⋮
- ⋮
- 16 Message on channel 16 can be transmitted/received.
- OFF Message from any channel cannot be transmitted/received.

- Press the function ∇ and \triangle keys under the display "MIDI-PGM" to select the MIDI program No. from 1 ~ 128.



MIDI Program No.: 1 ~ 128

- Press the function ∇ and \triangle keys under the display "SPX-MEM" to select MIDI-PGM corresponding to SPX990 program No.



SPX990 Program No.:

- P01~P80 Preset Memory No.
- U01~U99, U00 User Memory No.
- C01~C99, C00 Card Memory No.

- Repeat steps ⑤ and ⑥ and then set the program.
- Press the EDIT key if you want to return to the Page 1 of edit mode or press the MEMORY key to return to the memory mode.

MIDI PARAMETER CONTROL (Edit Mode: Page 2 and 3 menu)

When Control Change Message or the NOTE ON message is received from external MIDI devices, the parameter value of the SPX990 program can be changed. The following shows this setting.

1. Controller Assign (Edit Mode: Page 3 menu)

This function allows controller 1 and 2 to be assigned for control of effect parameters. Any controller that transmits MIDI signal control change No. can be used.

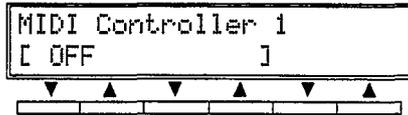
NOTE: The controller assign can be used for all programs.

Procedure:

- ① Press the EDIT key to get the edit mode and get Page 3 of the edit mode by the PAGE Select \triangle and ∇ keys.



- ② Press any function ∇ or \triangle key under the display "ExCTRL" to display the controller assign.



- ③ Press the PAGE Select \triangle and ∇ keys to display controller 1 or 2.

- ④ Press the function ∇ and \triangle keys under the display "[1 MOD WH]" to select the following messages.



Messages:

OFF	No control change No.s accepted.
1 MOD WH	Modulation Wheel
2 BREATH	Breath Controller
.	.
.	.
95	Control change No. 95

- ⑤ Repeat steps ③ and ④ if possible to assign another controller.

NOTE: If you assign the same message to controller 1 and 2, you can control the assigned parameters set at the same time.

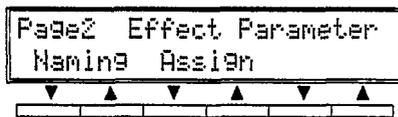
- ⑥ Press the EDIT key if you want to return to the Page 1 of edit mode or press the MEMORY key to return to the memory mode.

2. Parameter Assign (Edit Mode: Page 2 menu)

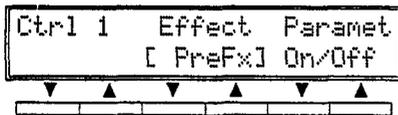
You can control any value of the parameter in the MIDI message or specified any program by assigning the controller 1 and 2.

Procedure:

- ① Recall a specific program, (see "Memory Recall" on page 10)
- ② Press the EDIt key to get the edit mode and then display Page2 of the edit mode by the PAGE Select Δ and ∇ keys.



- ③ Press any function ∇ or \blacktriangle key under the display "Assign" on the LCD to get the parameter assign display.
- ④ Press the PAGE Select Δ and ∇ keys to get the first display of the set controller 1 and 2.



- ⑤ Press any function ∇ or \blacktriangle key under the display "Effect" on the LCD to set the effect parameter (PreFx, MainFx, PostFx) to be controlled.
- ⑥ Press any function ∇ or \blacktriangle key under the display "Parameter" to set the parameter to be controlled.

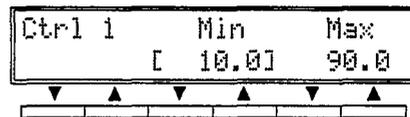
NOTE: There are some parameters which cannot be controlled by MIDI parameter control. Regarding these parameters, refer to "THE PROGRAMS AND PARAMETERS" on page 20 for the effects mark with "★".

- ⑦ Press the PAGE Select Δ and ∇ keys to display the possible range of parameter values.



When any message is received in SPX990, a possible range of parameter values between 0 ~ 100% can be set.

For instance, the pre and post effect of "Comp". L.Thrs parameter is set at a range of -24dB ~ +12dB. If a Min of 10% and a Max. of 90% are set, the parameter control range will become -20dB ~ +9dB. Adjust the actual sound with the possible range.



- ⑧ Press any function ∇ or \blacktriangle key under the display "Min" and "Max" to get the min. and max. values respectively.
- ⑨ Repeat the procedures from ④ ~ ⑧ if possible to assign another controller.
- ⑩ Store the program after setting the assigned parameter, (see "STORING A PROGRAM" on page 16)

MIDI BULK OUT (Edit Mode: Page 3 menu)

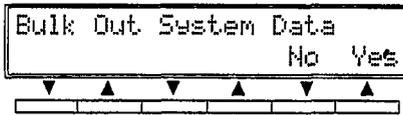
Data from the SPX990 can be transmitted to external devices through MIDI Bulk Out.

All Data



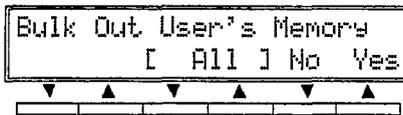
The date (System Data+User's Memory All+PGM Change Tbl+User's Scale) are bulked out.

System Data



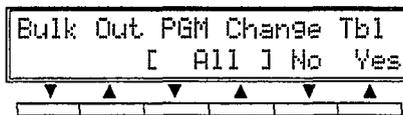
The data of MIDI Controller, Input Mode, Footswitch, User's Memory Program are bulked out.

User's Memory Data



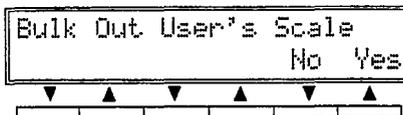
The specified User's memory data (U01 ~ U99, U00, All) are bulked out.

PGM Change Tbl Data



The program change table data of the specified banks (A, B, C, D or All) are bulked out.

User's Scale Data



The specified User Scale data (User-Scale 1,2) by intelligent pitch change are bulked out.

Procedure:

① Press the EDIT key to get the edit mode and then display Page 3 of the edit mode by the PAGE Select Δ and ∇ keys.

② Press any function ∇ or \blacktriangle key under the display "Bulk" to display the Bulk Out display.

③ Press the PAGE Select Δ and ∇ keys to display Bulk Out System Data screen.

④ When bulking out the user's memory data, specified the memory No. to be bulked out.

Press any function ∇ or \blacktriangle key under the display "[]" to set the memory No.(U01 ~ U99, U00, All) to be bulked out. When "All" is set, all the User's memory data will be bulked out.

NOTE: When bulking out the data to another SPX990, overwrite the same memory No. data of the receiving SPX990.

⑤ When bulking out the program change table data, specified the bank to be bulked out.

Press any function ∇ or \blacktriangle key under the display "[]" and specify the bank to be bulked out. If "All" is set, all the data in the bank's program change table will be bulked out.

NOTE: When bulking out the data to another SPX990, overwrite to same bank data of the receiving SPX990.

⑥ Press the function \blacktriangle key under the display "Yes" after selecting the bank to excute bulked out.

⑦ After bulking out the necessary data, the display will return to the previous screen.

Press the EDIT key if you want to return to the Page 3 of edit mode or press the MEMORY key to return to the memory mode.

APPENDIX

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Freq. Response	20Hz-20kHz±0.5dB
Dynamic Range	Above 100dB (Typical 106dB)
Ham. and Noise	Below -82dBm (Typical -88dBm)
Distortion	Below 0.005% at max. level 1kHz

INPUT

Number of Channel	2 (Phone Jack)
Nominal Level	+4/-20dBm (Switchable)
Highest Input	+24dBm (Switchable at +4dB)
Impedance	20k Ω

OUTPUT

Number of Channel	2 (Phone Jack)
Nominal Level	+4/-20dBm (Switchable)
Highest Output	+18dBm (Switchable at +4dB)
Impedance	150 Ω

AD/DA Conversion

A/D Conversion	20bits
D/A Conversion	20bits
Sampling Freq.	44.1kHz

MEMORY

Preset Program	1 - 80
User Memory Program	1 - 99,00
Optional Memory Card	1 - 99,00

MIDI CONTROL

Program Change	(Memory Select)
Note On	(Pitch Select)
Control Change	(Parameter Control)
Bulk Dump	(Parameter Dump, Program Change Table, System Setup Data)

FRONT PANEL

Control	Input Level (L, R), Data Entry
Keys	Function Key x 6, Page Select Key x 2, Memory, Store, Edit, Bypass
Display	2 ch. 8 segment LED (Level Meter) 6 segment LED (Mode Indicator) 7 segment LED (Memory No.) Memory, Edit, Bypass indicators 24 chara x 2 Line LCD
Slot	Memory Card

REAR PANEL

Connectors	Input L/R (XLR x 2, Phone jack x 2) Output L/R (XLR x 2, Phone Jack x 2) MIDI IN, THRU/OUT (DIN 5P x 2) Trigger (Phone Jack x 1) Bypass or INC/DEC (Phone Jack x 1)
Switch	IN/OUT Level Switch (+4dB/-20dB x 2) MIDI THRU/OUT Switch

GENERAL

Power Requirements	US & Canadian Models: 120V, 60Hz British Model: 240V, 50Hz General Model: 230V, 50Hz
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Power Consumption	25W
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Dimensions (W x H x D)	480 x 46 x 324.4 mm (18-7/8" x 1-13/16" x 12-3/4") (including attachments)
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Weight	4.6 kg (10 IDS. 2oz)
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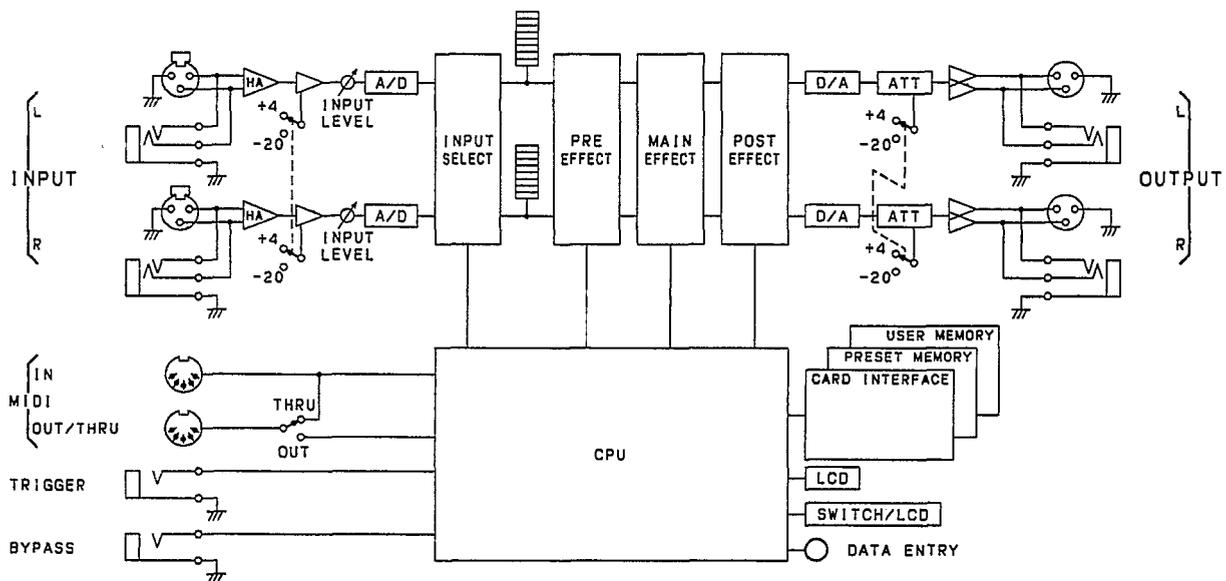
* 0dB=0.775Vr.m.s.

* Specifications and appearance subject to change without notice.

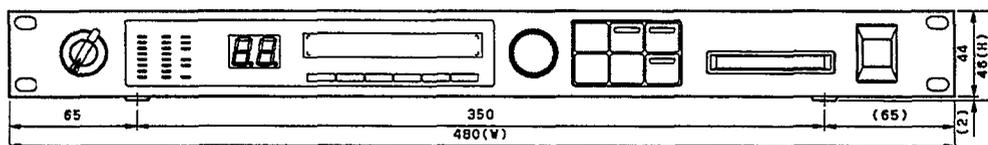
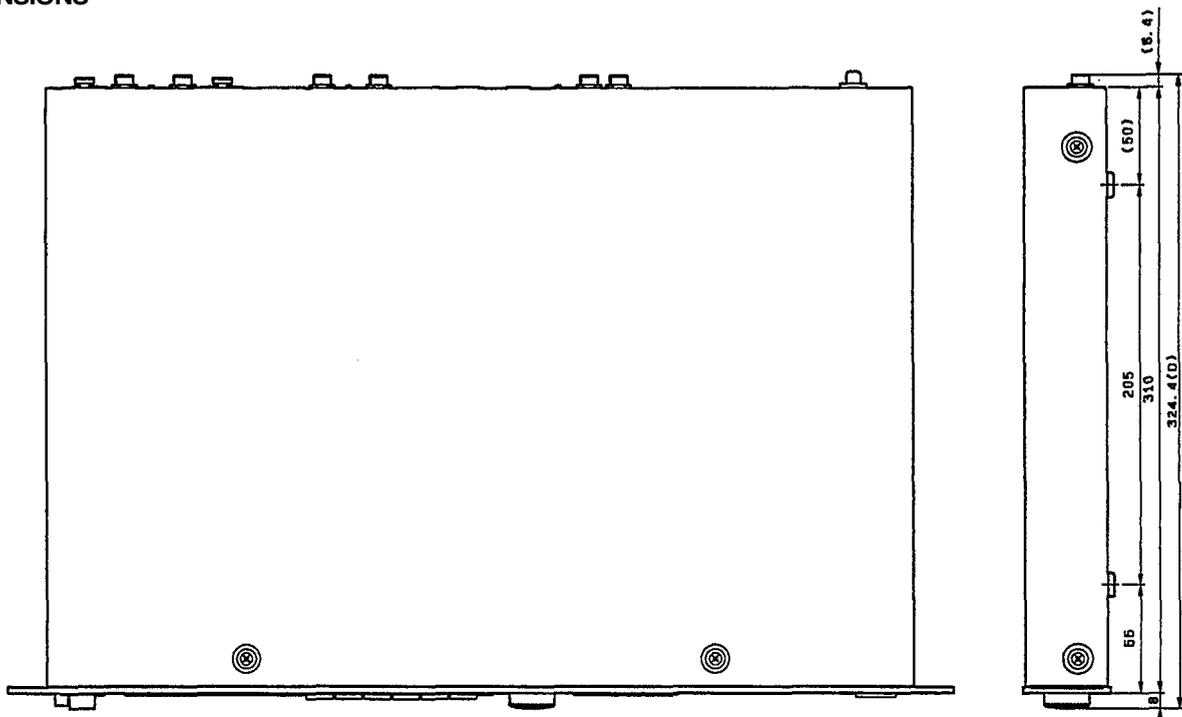
OPTION

Memory Card	MCD64 MCD32
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■ BLOCK DIAGRAM



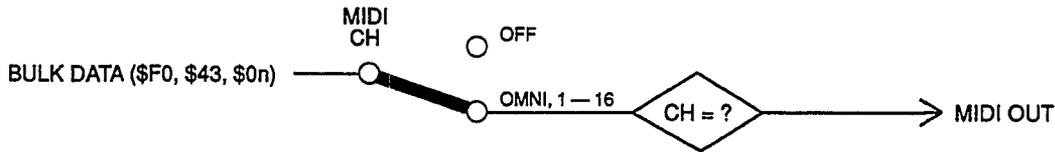
■ DIMENSIONS



(unit: mm)

MIDI DATA FORMAT

1. Transmission Conditions



2. Transmission Data

2-1 System Information

1) System Exclusive Messages

① Memory Bulk Data

When a MEMORY BULK OUT operation is performed or when a MEMORY BULK DUMP REQUEST message is received by the SPX990, the data is transmitted on the MIDI channel specified for the currently selected BANK. Data is transmitted from the User memory U01 to U00 in the format below if the memory number is set at "All".

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0000nnnn (0nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110(7EH)
BYTE COUNT	00000010 (02H)
BYTE COUNT	00110100 (34H)
HEADER	01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATANAME	01001101 (4DH) "M"
MEMORY	0mmmmmmm m= 1 (User Memory No.U01)- 100 (User Memory No.U00)
DATA	0ddddddd 298 BYTE
CHECK SUM	0eeeeeee
EOX	11110111 (F7H)

② Bank Program Change Table Bulk Data

When a BANK PROGRAM CHANGE TABLE BULK OUT operation is performed or when a BANK PROGRAM CHANGE TABLE BULK DUMP REQUEST message is received by the SPX990, data is transmitted on the MIDI channel specified for the currently selected BANK. Data is transmitted from Bank A to D in the format below if the bank number is set at "All".

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0000nnnn (0nH) n= 0 (channel number1)- 15 (channel number16)
FORMAT No.	01111110(7EH)
BYTE COUNT	00000010 (02H)
BYTE COUNT	00000101 (0AH)
HEADER	01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATA NAME	01010100 (54H) "T"
BANK No.	0zzzzzzz z=BANK 1-4 (1=A,2=B,3=C,4=D)
DATA	0ddddddd 256 BYTE
CHECK SUM	0eeeeeee
EOX	11110111 (F7H)

③ System Setup Bulk Data

When a SYSTEM SETUP BULK OUT operation is performed or when a SYSTEM SETUP DATA DUMP REQUEST message is received by the SPX990, data is transmitted on the MIDI channel specified for the currently selected BANK.

STATUS	111 10000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0000nmmn (0nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110(7EH)
BYTE COUNT	00000000 (00H)
BYTE COUNT	00011110(1EH)
HEADER	01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1" 01010011 (53H) "S"
DATA NAME	00100000 (20H) SPACE
SOFTVERSION#	Ovvvvvvv v=1 Orrrrrrr r=0
DATA	0ddddddd 18 BYTE
CHECKSUM	0eeeeee
EOX	11110111 (F7H)

④ User Scale Bulk Data

When a USER SCALE BULK OUT operation is performed or when a USER SCALE DATA DUMP REQUEST message is received by the SPX990, data is transmitted on the MIDI channel specified for the currently selected BANK. Data is transmitted in User-Scale 1,2 in the format below,

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0000nmmn (0nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110(7EH)
BYTE COUNT	00000011 (03H)
BYTE COUNT	00111011 (3BH)
HEADER	01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1" 01001001 (49H) "T"
DATANAME	00100000 (20H) SPACE
DATA	0ddddddd TUNE 0ddddddd } 72 Byte Mono Pitch User Scale 1 0ddddddd } 72 Byte Mono Pitch User Scale 2 0ddddddd } 72 Byte Dual Pitch User Scale 1 0ddddddd } 72 Byte Dual Pitch User Scale 2 0ddddddd } 72 Byte Triple Pitch User Scale 1 0ddddddd } 72 Byte Triple Pitch User Scale 2
CHECKSUM	0eeeeee
EOX	11110111 (F7H)

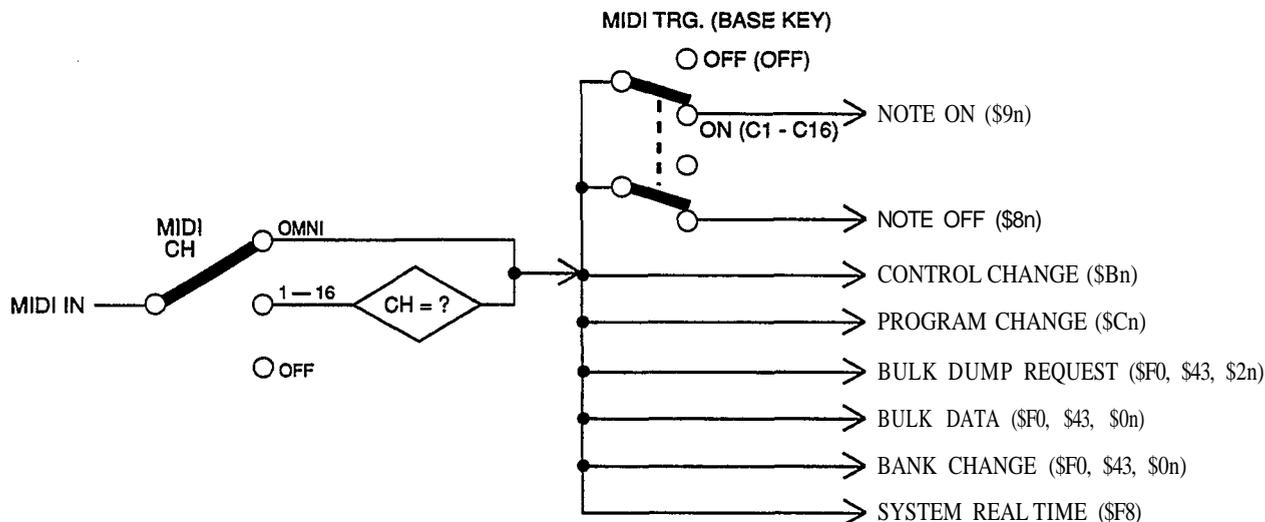
⑤ All Bulk Data

When an ALL BULK OUT operation is performed or when a ALL BULK DUMP REQUEST message is received by the SPX990, data is transmitted on the MIDI channel specified for the currently selected BANK.

All user program data from U01 to U100, all bank program change table A through D and system setup data will be transmitted in this order as follows:

- ① Program of User Memory No. U01 to U00
- ② Program Change Table Bank A through D
- ③ System Setup Data
- ④ User-Scale 1,2 Data

3. Reception Conditions



4. Reception Data

4-1 Channel Information

1) Channel Voice Messages

① Note On

Received on the channel specified for the selected bank. When the MidiTrg parameter is set at ON, the main effects of "Reverb", "FiltRev", "EchRoom" and "TrigPan" are triggered. Main effect of MONO PITCH, DUAL PITCH, TRIPLE PITCH and STEREO PITCH programs are received as messages to control pitch variation. The velocity value is ignored here. Data cannot be received when the base key parameter is set at OFF or when the Intelligent Select is at ON.

STATUS	1001nnnn (9nH)	n= 0 (Channel No.1)- 15 (Channel No.16)
NOTE No.	0kkkkkkk	k=0(C-2)-127(G8)
VELOCITY	0vvvvvvv	v=0-127

② Note Off

This message appears during main effect "Freeze" when playback is done and it affects the SPX990 only when the equipment signalling the end NOTE ON message is connected.

STATUS	1000nnnn (8nH)	n= 0 (Channel No.1)- 15 (Channel No.16)
NOTE No.	0kkkkkkk	k=0(C-2)-127(G8)
VELOCITY	0vvvvvvv	v=0-127

③ Control Change

Received on the channel specified for the selected bank. When a message is received, the value of the assigned effect parameter is changed according to the control value.

STATUS	101 1nnnn (BnH)	n= 0 (Channel No.1) - 15 (Channel No.16)
CONTROL NO.	0ccccccc	c=1-95
CONTROL VALUE	0vvvvvvv	v=0-127

④ Program Change

Received on the MIDI channel specified for the currently selected bank. When a message is received, the corresponding program is called from the program change table of the selected bank.

STATUS	1100nnnn (CnH)	n= 0 (Channel No.1) - 15 (Channel No.16)
PROGRAM NO.	0ppppppp	p=0-127

4-2 System Information

1) System Exclusive Messages

① Memory Bulk Dump Request

Received on the MIDI channel specified for the currently selected bank.

When received, the data corresponding to the specified memory program is transmitted.

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0010nnnn (2nH) n= 0 (channel number1)- 15 (channel number16)
FORMAT No.	01111110 (7EH) 01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATA NAME	01001101 (4DH) "M"
MEMORY	0mmmmmmm m= 1 (User Memory No.U01) - 100 (User Memory No.U00)
EOX	11110111 (F7H)

② Program Change Table Bulk Dump Request

Received on the MIDI channel specified for the currently selected bank.

When received, the data corresponding to the program change table of the specified bank is transmitted.

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0010nnnn (2nH) n= 0 (channel number1)- 15 (channel number16)
FORMAT No.	01111110 (7EH) 01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATA NAME	01010100 (54H) "T"
BANK No.	0zzzzzzz z=BANK 1-4 (1=A,2=B,3=C,4=D)
EOX	11110111 (F7H)

③ System Setup Data Bulk Dump Request

Received on the MIDI channel specified for the currently specified bank.

When received, the data corresponding to the system setup data of the specified bank is transmitted.

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0010nnnn (2nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110 (7EH) 01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATA NAME	01010011 (53H) "S" 00100000 (20H) SPACE
EOX	11110111 (F7H)

④ User Scale Data Bulk Dump Request

Received on the MIDI channel specified for the currently specified bank.

When received, the data corresponding to the User Scale Data of the specified bank is transmitted.

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0010nnnn (2nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110 (7EH) 01001100 (4CH) "L" 01001101 (4DH) "M" 00100000 (20H) SPACE 00100000 (20H) SPACE 00111000 (38H) "8" 01000001 (41H) "A" 00110010 (32H) "2" 00110001 (31H) "1"
DATA NAME	01001001 (49H) "T" 00100000 (20H) SPACE
EOX	11110111 (F7H)

2) System Real Time Message

When received on the MIDI channel, the main effects, "TmpEch1", "TmpEch2", "TmpEch4" are triggered. The tempo parameter is set automatically by timing clock.

TIMING CLOCK 11111000 (F8H)

⑤ Bank Change Request

Received on the MIDI channel specified for the currently selected bank.

When received, the specified bank is called up.

STATUS	11110000 (F0H)
ID No.	01000011 (43H)
SUB STATUS	0000nnnn (0nH) n= 0 (channel number1) - 15 (channel number16)
FORMAT No.	01111110 (7CH) Condition setup
BYTE COUNT	00000000 (00H)
BYTE COUNT	00001101 (0DH)
	01001100 (4CH) "L"
	01001101 (4DH) "M"
	00100000 (20H) SPACE
	00100000 (20H) SPACE
	00111000 (38H) "8"
	01000001 (41H) "A"
	00110010 (32H) "2"
	00110001 (31H) "1"
DATA NAME	01010101 (55H) "U"
	00100000 (20H) SPACE
VERSION #	0wvvvvv v=1
VERSION#	0rrrrrrr r=0
DATA	0zzzzzzz z=bank1-4 (1=A,2=B,3=C,4=D)
CHECKSUM	0eeeeeee
EOX	11110111 (F7H)

⑥ Memory Bulk Data

The data format is the same as "Memory Bulk Data" for transmission.

⑦ Bank Program Change Table Bulk Data

The data format is the same as "Bank Program Change Table Bulk Data" for transmission.

⑧ User Scale Bulk Data

The data format is the same as "User Scale Bulk Data" for transmission.

⑨ System Setup Bulk Data

The data format is the same as "System Setup Bulk Data" for transmission.

When received from the MIDI Data Filer, a computer or other sources, the time interval between data exchanges. F7 to F0 and other units must be set to 180msec or longer.

Function . . .	Transmitted	Recognized	Remarks
Basic Default Channel Changed	x x	1-16, off 1-16, off	memorized
Mode Default Default Altered	x x *****	OMNIoff/OMNIon x x	memorized
Note Number : True voice	x *****	0-127 x	
Velocity Note ON Note OFF	x x	x x	
After Key's Touch Ch's	x x	x x	
Pitch Bender	x	x	
Control Change 1 - 9 5	x	o	
Program Change : True #	x *****	o 0 - 127	*1
System Exclusive	o	o	Bulk Dump
System : Song Pos : Song Sel Common : Tune	x x x	x x x	
System :Clock Real Time :Commands	x x	o x	
Aux :Local ON/OFF :All Notes OFF Mes- :Active Sense sages:Reset	x x x x	x x x x	

Notes: *1 = For program 1 - 128, memory number of SPX990 is selected.

SFX990

USER PROGRAMMING TABLE

Date : / /

Programmer :

Memory No.	Program Name	EFFECT		
		PreFx	MainFx	PostFx
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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27				
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32				
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35				
36				
37				
38				
39				
40				

Memory No.	Program Name	EFFECT		
		PreFx	MainFx	PostFx
41				
42				
43				
44				
45				
46				
47				
48				
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80				

Date : / /

Programmer : _____

MIDI PGM	BANK / ch			
	A /	B /	C /	D /
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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32				
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34				
35				
36				
37				
38				
39				
40				
41				
42				
43				

MIDI PGM	BANK / ch			
	A /	B /	C /	D /
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
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81				
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83				
84				
85				
86				

MIDI PGM	BANK / ch			
	A /	B /	C /	D /
87				
88				
89				
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96				
97				
98				
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128				

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SPX990 OM



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