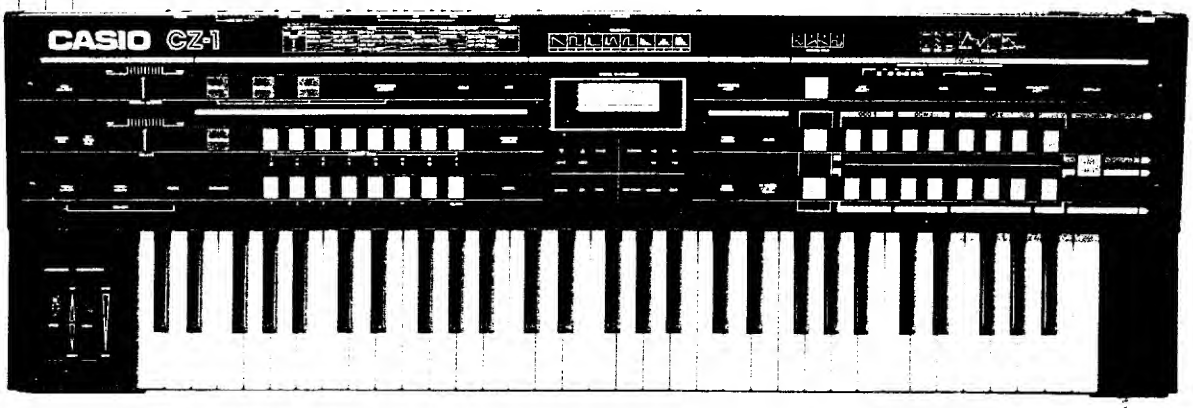
SPARE PARTS MASTER

COSMOSYNTHESIZER

CZ-1

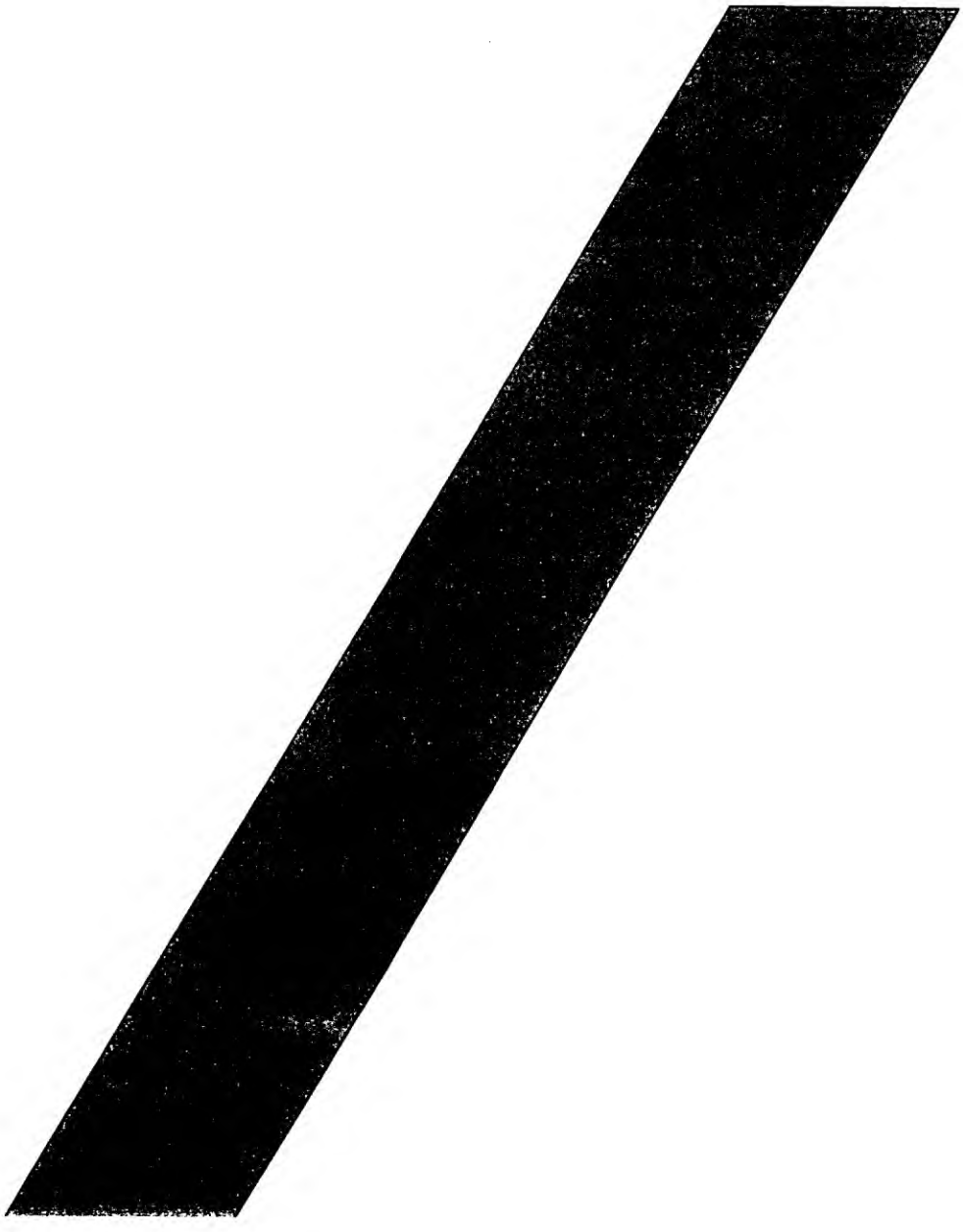


OPERATION MANUAL 1
MANUAL DE OPERACION 69

CASIO



Congratulations upon your selection of a Casio CZ-1. The CZ-1 is a state-of-the-art musical instrument which incorporates the latest electronics technology to make its operation as easy as possible. Exceptional sound quality backed up by a host of sophisticated features and functions makes the CZ-1 a truly unique musical instrument. In order to enjoy the features and functions of the CZ-1 to their fullest, be sure to carefully read this manual and follow the instructions contained herein.



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CZ-1 MODES

The CZ-1 is a fully digital synthesizer under control of an LSI (large-scale integrated circuit). CASIO's original PD sound source teams up with the sound creation concepts found in traditional analog models to produce sounds of unbelievable quality and depth.

MODES

The operation of the CZ-1 can be divided into four major modes, the details of which are explained below.

■ NORMAL MODE

① Recall and play of tones stored in memory
② Modification of recalled tone data to form new tones
③ Creation of totally new tones
④ Application of various effects to tones
⑤ Storage of tones to internal memory or to RAM cartridges (optional)

■ KEY SPLIT MODE

① Recall of two tones for assignment to UPPER keyboard and LOWER keyboard
② Modification of recalled tones into new tones
③ Setting of keyboard split point
④ Independent setting of level and effect for each tone
⑤ Writing of split to operation memory

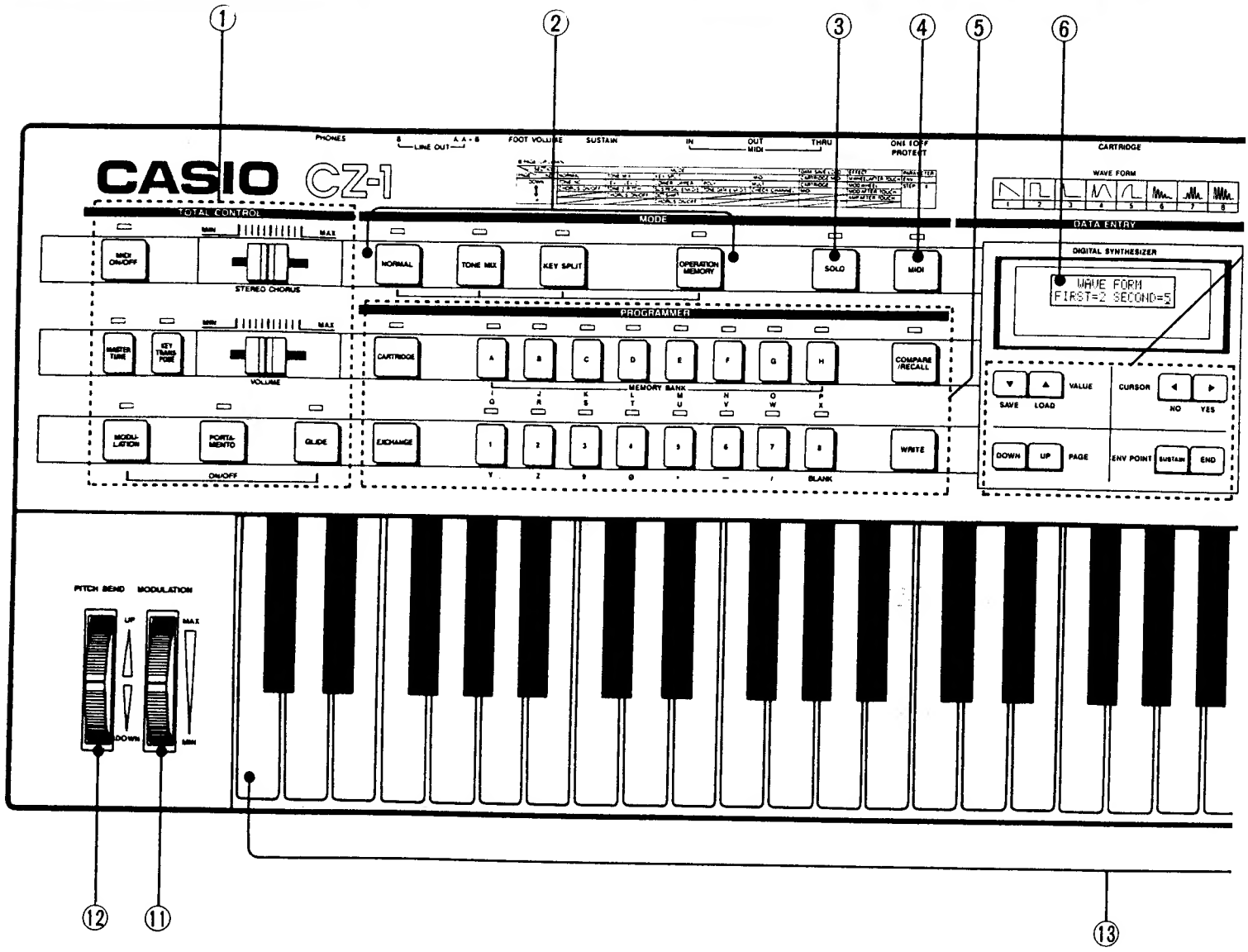
■ TONE MIX MODE

① Recall of two tones for mixing
② Modification of recalled tones into new tones
③ Setting of level balance and detune for two mixed tones
④ Writing of mixed tones to operation memory

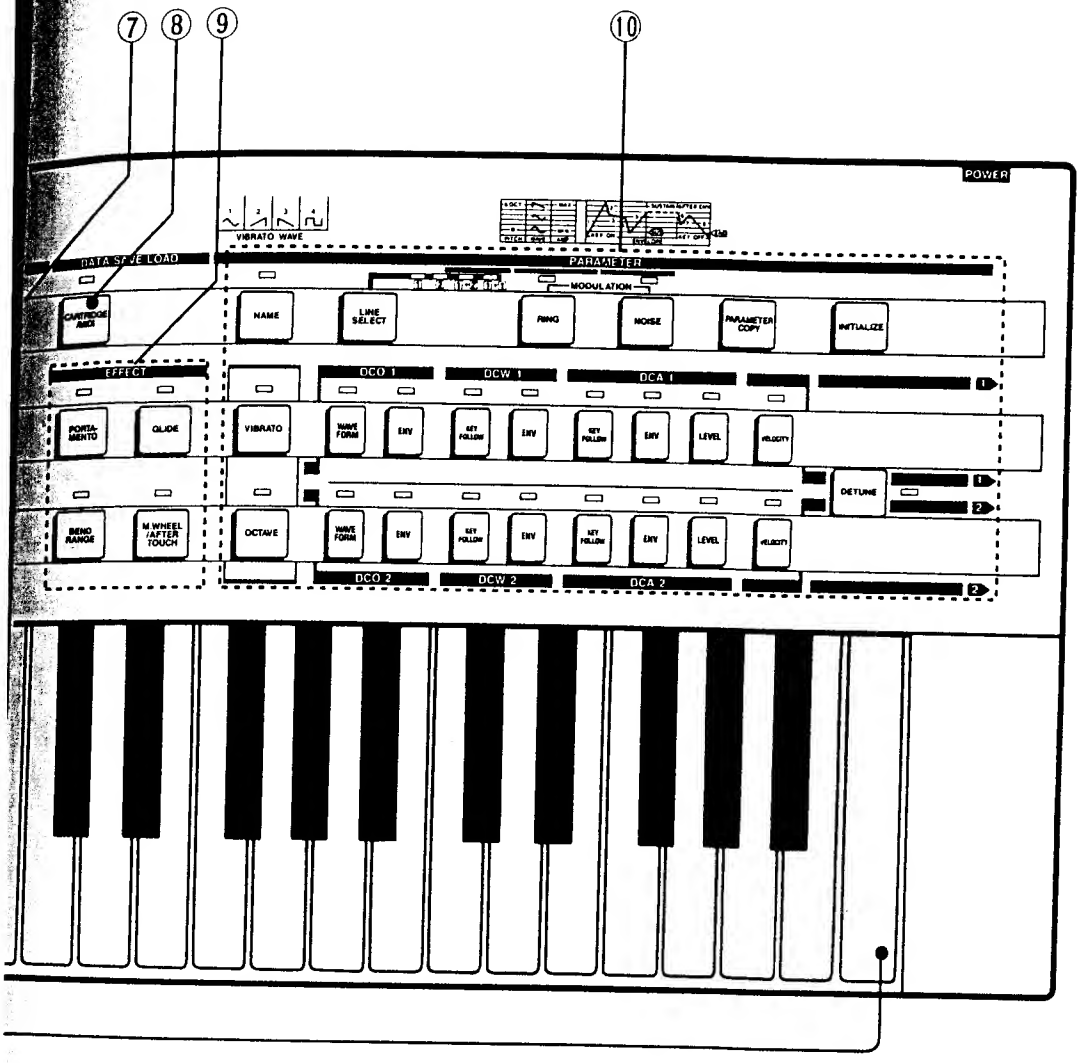
■ OPERATION MEMORY MODE

① Storage of panel settings (operation) made in NORMAL, TONE MIX and KEY SPLIT modes
② Recall of operation memory contents
③ Writing of all stored operation memory data to RAM cartridges

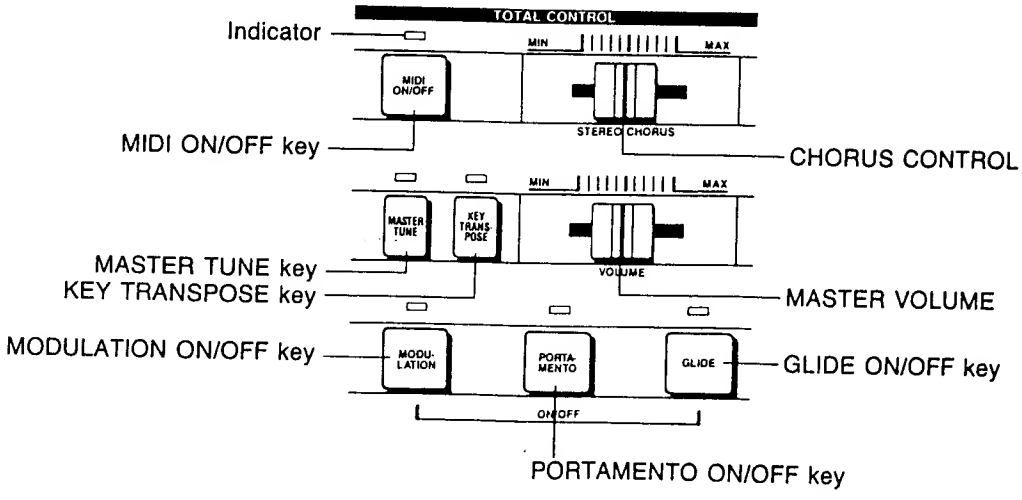
GENERAL GUIDE—FRONT PANEL



①OVERALL CONTROL SECTION
②MODE SELECT SECTION
③SOLO KEY
④MIDI KEY
⑤PROGRAMMER SECTION
⑥LIQUID CRYSTAL DISPLAY (LCD)
⑦DATA ENTRY SECTION
⑧CARTRIDGE/MIDI KEY
⑨EFFECT SECTION
⑩PARAMETER SECTION
⑪MODULATION WHEEL
⑫PITCH BEND WHEEL
⑬KEYBOARD



① OVERALL CONTROL SECTION



•MIDI ON/OFF key
Switches between MIDI ON and MIDI OFF modes. MIDI ON is in effect and the indicator is lit when the power of the keyboard is switched ON. In the MIDI OFF mode, the indicator is not lit, and MIDI message communications are impossible.

•MASTER TUNE key
Adjusts the pitch of the keyboard within a range of ±100 cents (one semitone). The standard pitch is set at A4 = 442Hz.

•KEY TRANSPOSE key
Transposes the key of the keyboard at semitone steps within the range of G ~ F#.

•MODULATION ON/OFF key
Switches modulation ON and OFF. When ON, the indicator lights, and modulation is applied in accordance with the position of the MODULATION WHEEL ⑪ and the keyboard after touch setting.

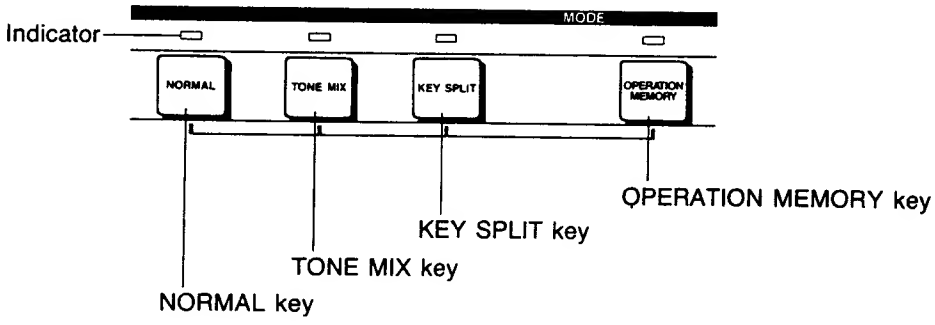
•PORTAMENTO ON/OFF key
Switches portamento ON and OFF. When ON, the indicator lights, and portamento is applied in accordance with the portamento time which is set using the PORTAMENTO key in the EFFECT SECTION ⑨.

•GLIDE ON/OFF key
Switches glide ON and OFF. When ON, the indicator lights, and glide is applied in accordance with the NOTE and TIME values which are set using the GLIDE key in the EFFECT SECTION ⑨.

•VOLUME (master volume)
Adjusts the output level through line out and the headphone volume.

•STEREO CHORUS (chorus control)
Adjusts the strength of the chorus effect. The chrous effect becomes stronger as the setting moves towards MAX, and weaker as MIN is approached.

② MODE SELECT SECTION



•NORMAL key
Sets the NORMAL mode.

•TONE MIX key
Sets the TONE MIX mode.

•KEY SPLIT key
Sets the KEY SPLIT mode.

•OPERATION MEMORY key
Sets the OPERATION MEMORY mode.

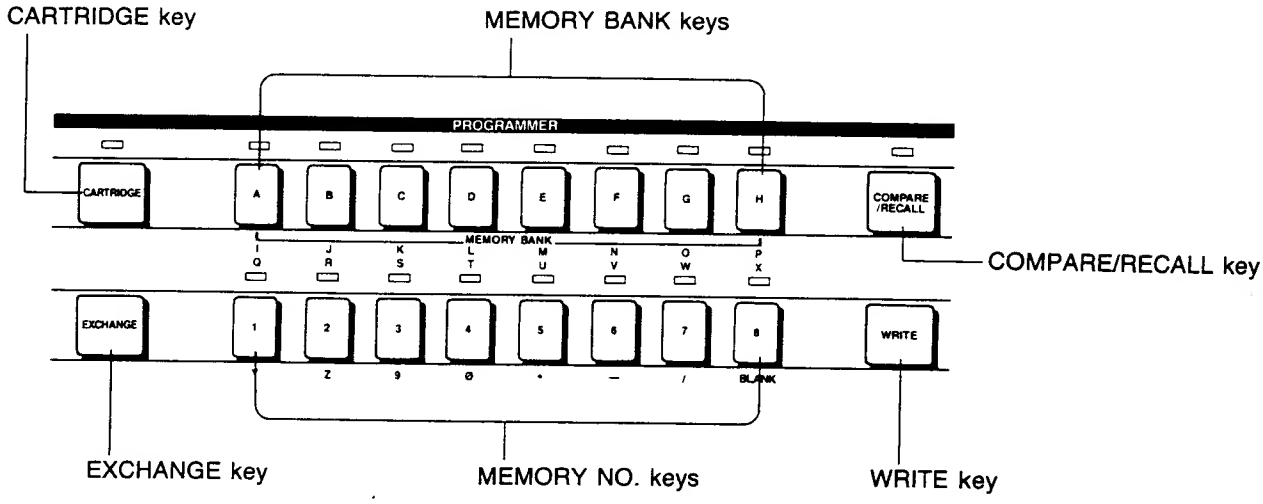
* The mode indicators light to indicate the current mode setting. One of the mode indicators lights to indicate the current mode setting. The NORMAL, TONE MIX, and KEY SPLIT indicators can only be lit while the OPERATION MEMORY mode is in effect.

③ SOLO key
Switches the solo function ON and OFF. When ON, the indicator lights and monophonic play only is possible on the keyboard. When OFF, the keyboard is capable of up to 16-note polyphonic.

④ MIDI key

Switches the MIDI send/receive mode ON and OFF. When ON, the indicator lights and data send/receive operations with the MIDI musical instrument or computer connected to the MIDI terminals on the rear panel become possible (see page 52).

⑤ PROGRAMMER SECTION



•MEMORY BANK keys

Used to select one of eight memory banks (A through H). The indicator above the bank which is selected lights when its key is pressed.

•MEMORY NO. keys

Used to select one of eight memory numbers (1 through 8). The indicator above the bank which is selected lights when its key is pressed.

•CARTRIDGE key

Switches ON and OFF when a ROM cartridge or RAM cartridge (both optional) are loaded. When ON, selected tone data can be recalled directly from the loaded cartridge.

•EXCHANGE key

Swaps the memory banks and memory numbers of two tones selected from among the 128 internal and cartridge tones.

•COMPARE/RECALL key

Compares original tone data with tone data created by altering the original tone data. The newly created data is temporarily stored in the COMPARE/RECALL area automatically, and the indicator above this key lights when tone data is altered. Pressing this key so the indicator is OFF recalls the original tone, while pressing again so the indicator is ON recalls the newly created tone.

The CZ-1 is equipped with a COMPARE/RECALL area capable of storing a total of up to five tones: 1 in the NORMAL mode, 2 in the TONE MIX mode, 2 in the KEY SPLIT mode.

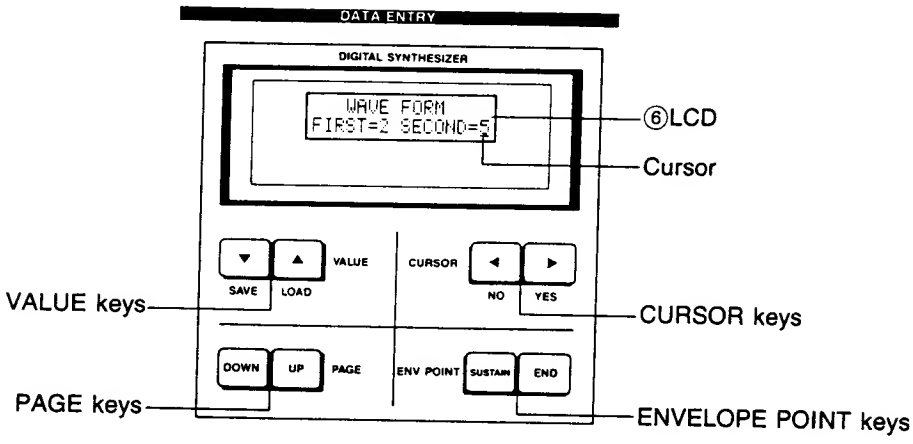
•WRITE key

Writes tone data newly created using the PARAMETER SECTION ⑩ at a selected location on an internal memory or a RAM cartridge, and operation data set on the panel to a selected operation memory.

⑥ LIQUID CRYSTAL DISPLAY (LCD)

The 32-character liquid crystal display shows the current status of the CZ-1, including such data as tone number, tone name, parameter name, and data. All settings should be performed while monitoring the values on this display.

⑦ DATA ENTRY SECTION



•VALUE keys

Used to change the data (values) that appear on the LCD ⑥. Each press of the ▼ key decreases a value by 1, while each press of the ▲ key increases a value by 1. Holding either key down causes high speed continous decrease/increase of a value. These keys are also used for cartridge data SAVE and LOAD operations.

*In the case of KEY TRANSPOSE, these keys are used to change the key name (represented by alphabetic characters) rather than numeric values. For MASTER TUNE, these keys change the pitch of the keyboard, but the LCD does not show any numeric value.

•ENV POINT keys

Used to specify the SUSTAIN POINT and END POINT for each of the six envelopes in the dual-line DCO, DCW, DCA envelopes of the PARAMETER SECTION ⑩.

•PAGE keys

Scrolls the data shown on the LCD ⑥ to display the various parameters shown in the table below. The UP key scrolls the display up, while the DOWN key scrolls the display down.

•CURSOR keys

Used to move the cursor (" _ " below data) on the LCD ⑥. The ◀ key moves the cursor to the left, while the ▶ moves the cursor to the right, when multiple parameters are being displayed.

*These keys are also used as YES (◀) and NO (▶) keys in data SAVE/LOAD operations, and when initializing the keyboard memory contents.

■ PAGE (UP/DOWN)

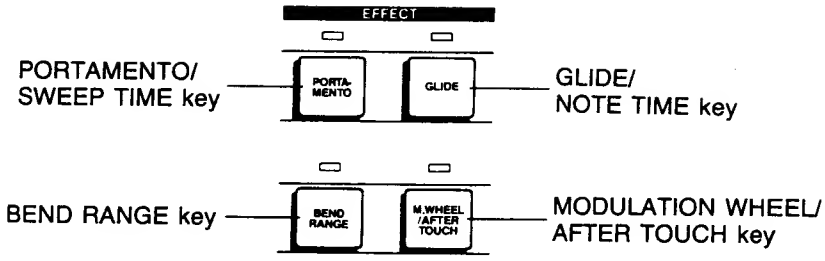
SECTION / PAGE / KEY	MODE					DATA SAVE/LOAD	EFFECT	PARAMETER
DOWN	NORMAL	TONE MIX	KEY SPLIT	MIDI		CARTRIDGE/MIDI	M.WHEEL/AFTER TOUCH	ENV
↕	CHORUS ON/OFF	TONE 2 PITCH	SUS.PEDAL ENA/DIS	TONE DATA ENA/DIS	CHECK CHANNEL	CARTRIDGE	MOD.WHEEL	STEP 1 - 8
		CHORUS ON/OFF	OCT.SHIFT			MIDI	MOD.AFTER TOUCH	
UP	TONE NO.	LEV 1, LEV 2	LOWER, UPPER	POLY	MULTI		AMP.AFTER TOUCH	
			CHORUS ON/OFF					

⑧ CARTRIDGE/MIDI key

Used to SAVE data for the 64 internal tones or 64 operation memories from the keyboard to a RAM cartridge (optional) or to LOAD data from a cartridge to the keyboard. After scrolling, using the PAGE UP key, these keys are also used for data transmission between two CZ-1's or between a CZ-1 and other Casio synthesizers.

*When the CARTRIDGE KEY of the PROGRAMMER SECTION is used, specific tones are directly recalled from a cartridge, so internal tone data is no affected. In the case of the CARTRIDGE/MIDI key, however, all 64 tones on the cartridge are written to the keyboard's internal memory by the LOAD operation.

⑨ EFFECT SECTION



•PORTAMENTO key

Used to set the portamento time. Portamento is applied in accordance with the value set when the PORTAMENTO ON/OFF key in the OVERALL CONTROL SECTION ① is ON.

•GLIDE key

Used to set the glide pitch difference and time. Glide is applied in accordance with the values set when the GLIDE ON/OFF key in the OVERALL CONTROL SECTION ① is ON.

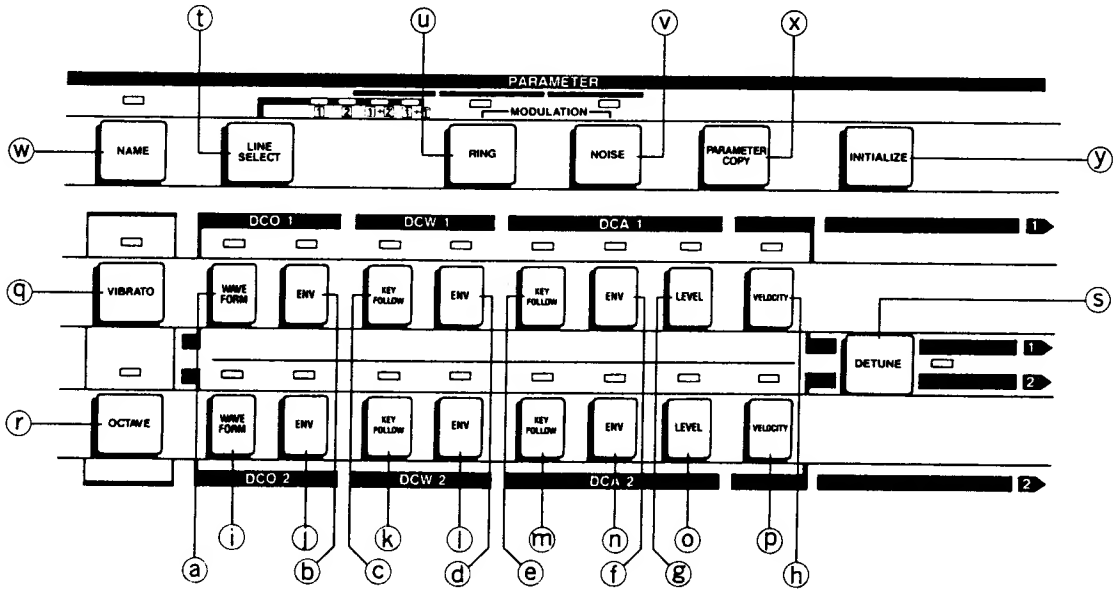
•BEND RANGE key

Used to set the range for the PITCH BEND WHEEL ⑭.

•MODULATION WHEEL/ AFTER TOUCH key

Used to set the range for the MODULATION WHEEL ⑪, the modulation range for the keyboard after touch, and the volume range for the keyboard after touch. These parameters are displayed using the PAGE UP/DOWN keys. The modulation effect is applied when the MODULATION ON/OFF key in the OVERALL CONTROL SECTION ① is ON.

⑩ PARAMETER SECTION



ⓐWAVEFORM key

Pressed to select the LINE 1 waveform (basic waveform).

ⓑDCO ENV key

Pressed to set the LINE 1 pitch envelope.

ⓒDCW KEY FOLLOW key

Pressed to cause the waveform for the LINE 1 DCW to approach a sine wave (cosine wave) at the higher range of the keyboard.

ⓓDCW ENV key

Pressed to set the LINE 1 wave envelope.

ⓔDCA KEY FOLLOW key

Pressed to cause the envelope for the LINE 1 DCW to shorten (timewise) at the higher range of the keyboard.

ⓕDCA ENV key

Pressed to set the LINE 1 amp envelope.

ⓖLEVEL key
Pressed to set the overall volume level for the LINE 1 DCA.

ⓗVELOCITY key
Pressed to set the degree of change in accordance with the key touch strength for the LINE 1 amp (volume), wave (timbre), and pitch (pitch) envelopes.

ⓘWAVEFORM key
Pressed to select the LINE 2 waveform.

ⓙDCO ENV key
Pressed to set the LINE 2 pitch envelope.

ⓚDCW KEY FOLLOW key
Pressed to cause the waveform for the LINE 2 DCW to approach a sine wave (cosine wave) at the higher range of the keyboard.

ⓛDCW ENV key
Pressed to set the LINE 2 wave envelope.

ⓜDCA KEY FOLLOW key
Pressed to cause the envelope for the LINE 2 DCW to shorten (timewise) at the higher range of the keyboard.

ⓝDCA ENV key
Pressed to set the LINE 2 amp envelope.

ⓞLEVEL key
Pressed to set the overall volume level for the LINE 2 DCA.

ⓟVELOCITY key
Pressed to set the degree of change in accordance with the key touch strength for the LINE 2 amp (volume), wave (timbre) and pitch (pitch) envelopes.

ⓠVIBRATO key
Pressed to set vibrato for each tone in accordance with four parameters: wave, delay, rate, depth.

ⓡOCTAVE key
Pressed to raise or lower the pitch of a tone in one-octave steps.

ⓢDETUNE key
Pressed to set differences in pitch between LINE 1 and LINE 1', or LINE 2 and LINE 2'.

ⓣLINE SELECT key
Pressed to select a line or line combination for sound creation. Each press of this key changes the line setting in the sequence: [1] → [2] → [1] + [2] → [1] + [1], and a indicator lights to show the current selection.

ⓤRING key
Pressed to apply ring modulation to either LINE 1' or LINE 2'.

ⓥNOISE key
Pressed to apply noise modulation to either LINE 1' or LINE 2'.

ⓦNAME key
Pressed to allow writing of a name up to 16 characters long for a tone.

ⓧPARAMETER COPY key
Used to copy waveform and envelope parameter data between LINE 1 and LINE 2 in single-parameter units.

ⓨINITIALIZE key
Pressed to initialize each data value. This key is held down and the parameter key for the value to be initialized is pressed simultaneously.

⑪ MODULATION WHEEL
Turning this wheel when the MODULATION ON/OFF key in the OVERALL CONTROL SECTION ① is ON adjusts vibrato depth in accordance with the range set using the MODULATION WHEEL/AFTER TOUCH key in the EFFECT SECTION ⑨.
*Turning the wheel has no effect at all when the MODUALTION ON/OFF key is OFF.

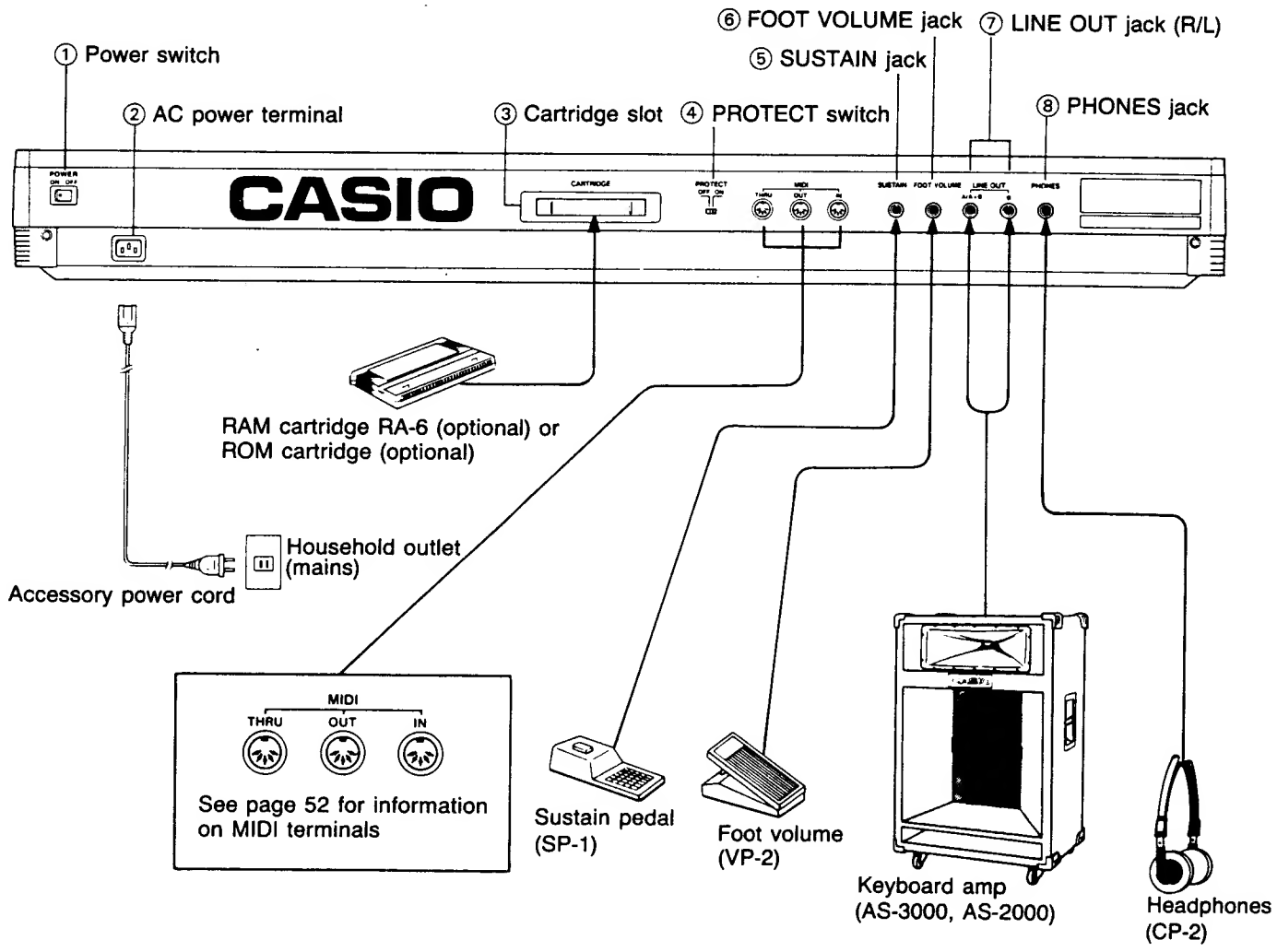
⑫ PITCH BEND WHEEL
Turning this wheel controls pitch in accordance with the range set using the BEND RANGE key in the EFFECT SECTION ⑨.

⑬ Keyboard
A 61-key, 5-octave, 16-note maximum polyphonic keyboard with initial/after touch sensors.
*8-note polyphonic when 2DCO is being used, 4-note polyphonic when TONE MIX is being used, monophonic when SOLO is ON.

GENERAL GUIDE—REAR PANEL

The CZ-1 does not come equipped with a built-in speaker, so either headphones or a keyboard amp and speaker system must be used to produce sound.

•CONNECTION DIAGRAM (CZ-1 REAR PANEL)



① Power switch
Switches power ON and OFF.

② AC power terminal
For connection of the accessory AC power cord.

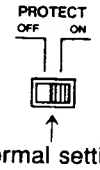
③ Cartridge slot
For loading of ROM cartridge or RAM cartridge, both optional.

④ PROTECT switch
Protects internal tone data and operation memory data from inadvertent erasure.

MEMORY PROTECTION FUNCTION

This function protects memory contents by making WRITE operations impossible while the PROTECT switch is in the ON position. It also protects against loss of internal memory data by loading data from an optional RAM cartridge.

*Always leave the PROTECT swtich in the ON setting except during WRITE, EXCHANGE, SAVE and LOAD operations.



Normal setting

•Memory protection power supply

The contents of the internal memory of the CZ-1 are protected by a lithium battery with a life of approximately 5 years. Memory contents may be altered or lost entirely when the battery weakens, so be sure to have the battery replaced by an authorized service person before the end of the battery's life is reached.

⑤ SUSTAIN
For connection of the optional sustain pedal (SP-1) for control of the sustain effect. Connection of a sustain pedal gives the pedal priority over manual settings.
*In the KEY SPLIT mode, panel settings allow sustain pedal control to be applied independently to the UPPER and LOWER keyboard tones.

⑥ FOOT VOLUME
For connection of the optional foot volume pedal (VP-2) for foot control of the overall volume level.

⑦ LINE OUT (R/L)
For connection to keyboard amplifiers, external audio equipment, etc.
*Stereo output is provided when speakers are attached to each jack. Connection to a single jack provides monaural output (A and B output mixed).

STEREO OUTPUT

Terminal			
MODE	CHORUS ON/OFF	A / A + B	B
NORMAL	ON	NORMAL mode tone	NORMAL mode tone
	OFF	ditto	ditto
TONE MIX	TONE1 = ON TONE2 = ON	TONE1 + TONE2	TONE1 + TONE2
	TONE1 = ON TONE2 = OFF	TONE1 + TONE2	TONE1
	TONE1 = OFF TONE2 = ON	TONE2	TONE1 + TONE2
	TONE1 = OFF TONE2 = OFF	TONE2	TONE1
KEY SPLIT	UPPER = ON LOWER = ON	UPPER + LOWER	UPPER + LOWER
	UPPER = ON LOWER = OFF	UPPER	UPPER + LOWER
	UPPER = OFF LOWER = ON	UPPER + LOWER	LOWER
	UPPER = OFF LOWER = OFF	UPPER	LOWER

*Stereo chorus effect adjusted by the chorus control is applied to tones where CHORUS = ON.

MONAURAL OUTPUT (one jack only)

Connection		Output	
A/A + B	B	A/A + B	B
Monaural plug		A + B mixed output	
	Monaural plug		A + B mixed output

⑧ PHONES (Headphone jack)
For connection of optional headphones (CP-2). Output from the speakers is automatically cut when headphones are connected.

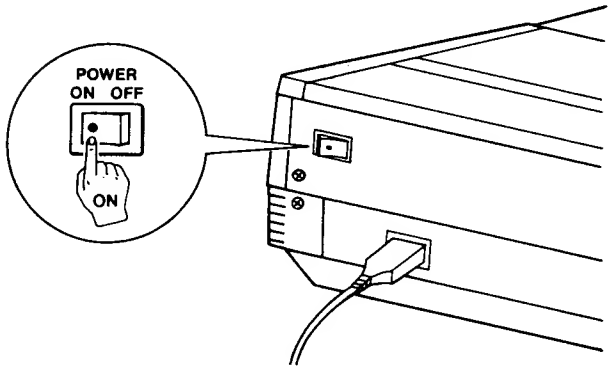
PART 1

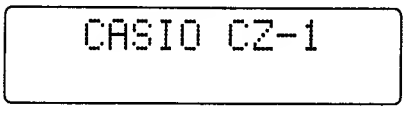
NORMAL MODE

1-1 RECALLING INTERNAL TONES

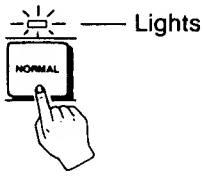
(1) NORMAL MODE SETTING

① First switch the power of the unit ON. At this time, the LCD should appear as illustrated below:



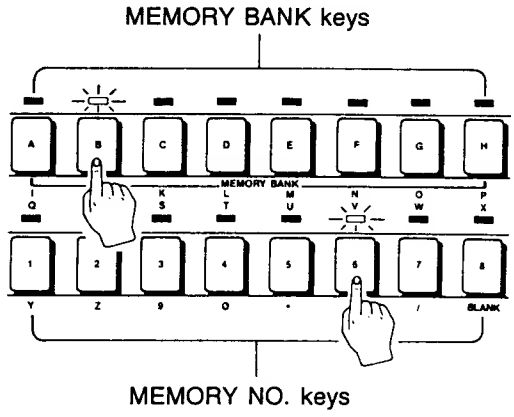


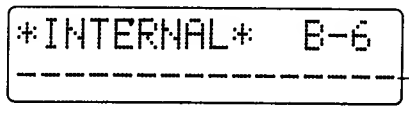
② The NORMAL mode will already be set if it was in effect when the power of the keyboard was switched OFF. Otherwise, press the NORMAL key in the MODE SELECT SECTION.



(2) INTERNAL TONES

64 different tones are preset in memory for the internal tones. Internal tones are selected using the MEMORY BANK keys (A ~ H) and the MEMORY NO. keys (1 ~ 8) in the PROGRAMMER SECTION to specify tone numbers.





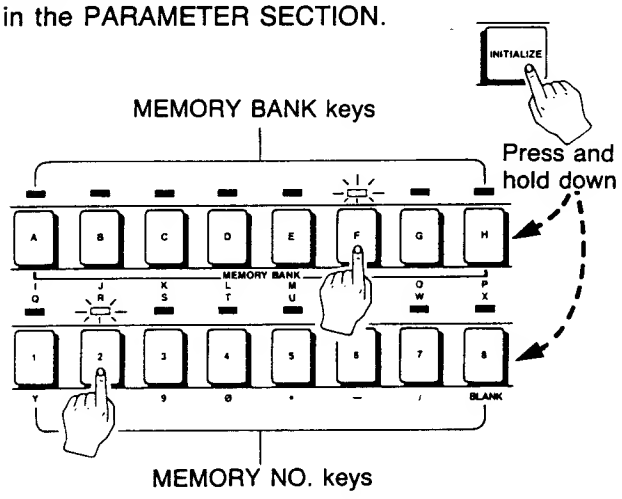
Any tone name up to 16 characters long can be assigned.

The internal tones are preset at the factory with tones that are identical to the 64 preset tones (see page 14 PRESET TONE TABLE).

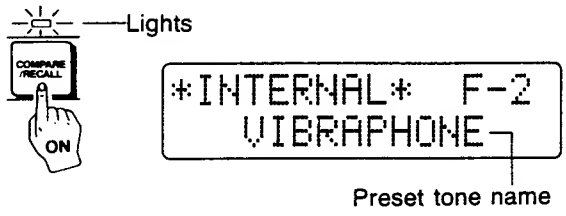
1-2 RECALLING PRESET TONES

The internal ROM of the CZ-1 is programmed with 64 preset tones which can be called whenever needed for play or for modification into internal tones.

Press a MEMORY BANK key and MEMORY NO. key to specify the preset tone of your choice while holding down the INITIALIZE key in the PARAMETER SECTION.



- This operation does not erase or otherwise affect the internal tone in the memory with the same number as that selected.
- The preset tone selected is called to the COMPARE/RECALL area of the PROGRAMMER SECTION, and this situation will be indicated by the lit indicator above the COMPARE/RECALL key. The name of the preset tone called will be shown on the LCD.



- The indicator above the COMPARE/RECALL key will go ON and OFF with each press of the key. The internal tone with the same number as that specified is called when the indicator is OFF.

NOTE

- The COMPARE/RECALL area is used for temporary storage of tone data. The WRITE procedure (see page 36) should be used to write the called preset tone to the internal bank. The SYSTEM INITIALIZE operation should be used to write all preset tones to the internal bank.
- Tone data stored in the COMPARE/RECALL area is retained even when the power of the keyboard is switched OFF.

BANK No.	A	B	C	D
1	BRASS 1	ACO. GUITAR	BRASS 4	PIANO 1
2	BRASS 2	JAZZ GUITAR	SAXOPHONE	PIANO 2
3	BRASS 3	ELEC. GUITAR	CELLO	PIANO 3
4	STRINGS 1	SLAP BASS	FLUTE	ELEC. PIANO
5	STRINGS 2	SYNTH. BASS	WHISTLE	HONKY-TONK
6	STRINGS 3	ELEC. BASS 1	HARMONICA	FUNKY CLAVI. 1
7	STRINGS 4	ELEC. BASS 2	RECORDER	FUNKY CLAVI. 2
8	ORCHESTRA	HARP	KOTO	HARPSICHORD

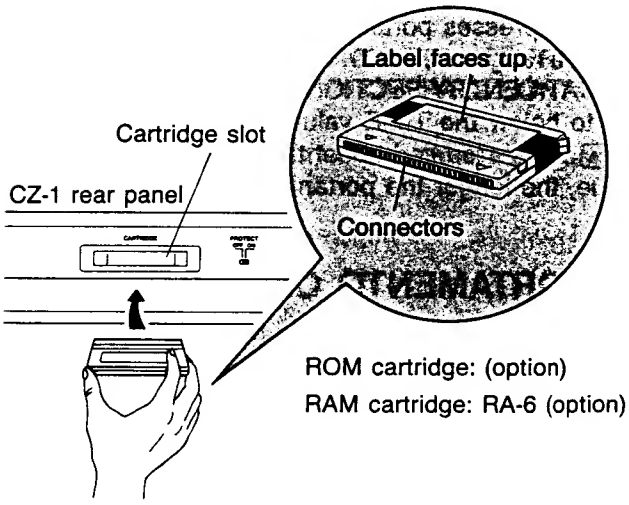
BANK No.	E	F	G	H
1	JAZZ ORGAN 1	MUSIC BOX	SYNTH. STRINGS	SYNTH. DRUMS 1
2	JAZZ ORGAN 2	VIBRAPHONE	FAT ENSEMBLE	SYNTH. DRUMS 2
3	PIPE ORGAN 1	XYLOPHONE	SITAR	CONGA
4	PIPE ORGAN 2	MARIMBA	SYNTH. LEAD 1	STEEL DRUM
5	ACCORDION	MALLET LOG	SYNTH. LEAD 2	SWEEP SOUND 2
6	VOICE 1	AFRO-PERCUSSION	SYNTH. LEAD 3	MOTORCYCLE
7	VOICE 2	BELLS	SYNTH. LEAD 4	JET ROAR
8	VOICE 3	METALLIC SOUND	SWEEP SOUND 1	TYPHOON SOUND

1-3 RECALLING CARTRIDGE TONES

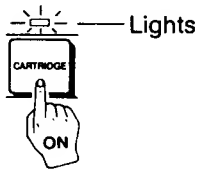
Loading ROM cartridges or RAM cartridges (both optional) into the keyboard allows direct access to 64 cartridge tones in addition to the 128 internal and preset tones.

•DIRECT CARTRIDGE TONE ACCESS

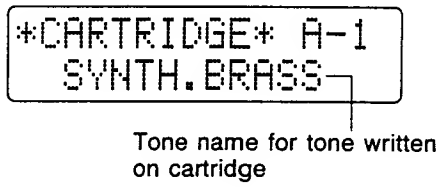
① Load an optionally available ROM cartridge or RAM cartridge into the cartridge slot on the rear panel of the keyboard.



② Press the CARTRIDGE key in the PROGRAMMER SECTION so that the indicator above the key lights.



③ Select a tone number using the MEMORY BANK keys and the MEMORY NO. keys in the PROGRAMMER SECTION. The name of the tone selected will appear on the LCD as illustrated below.



NOTE

Use the LOAD operation (see page 36) to write the called cartridge tone to the internal bank. The LOAD operation can also be used to write all the cartridge tones to the internal bank.

1-4 EFFECT/OVERALL CONTROL

The four effects shown below can be applied in the NORMAL mode. STEREO CHORUS ON/OFF, MASTER TUNE, and KEY TRANSPOSE are also possible in this mode.

EFFECT	Parameters (EFFECT SECTION)	CONTROL
PORTAMENTO	SWEEP = 0,1 / TIME = 00 ~ 99	ON/OFF
GLIDE	TONE = – 12 ~ + 12 / TIME = 00 ~ 99	ON/OFF
PITCH BEND	RANGE = 0 ~ 12	BEND WHEEL
MOD. WHEEL /AFTER TOUCH	MOD. WHEEL DEPTH = 00 ~ 99	MOD. WHEEL
	MOD. AFTER TOUCH DEPTH = 00 ~ 99	Key after touch
	AMP. AFTER TOUCH RANGE = 00 ~ 15	Key after touch

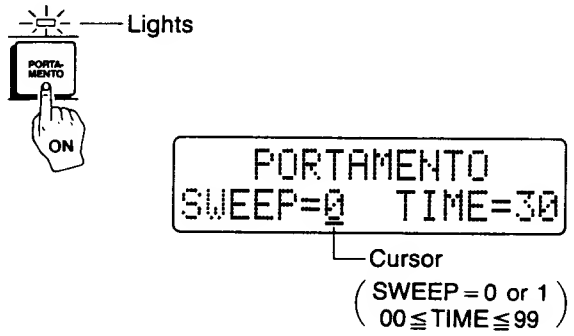
*All four effects are applied in the same way for all tones.

(1) PORTAMENTO

The portamento effect of the CZ-1 can be applied using either a fixed period in accordance with the PORTAMENTO TIME setting or a variable period in accordance with the difference in the pitch. Application of portamento also differs according to whether or not the SOLO key is ON or OFF.

① PORTAMENTO SWEEP/ TIME SETTING

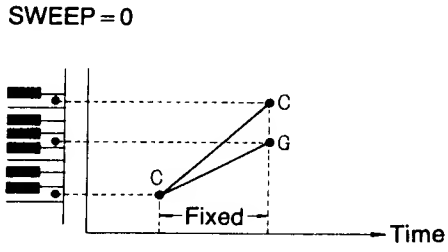
The LCD will appear as illustrated below when the PORTAMENTO key in the EFFECT SECTION is ON.



The SWEEP parameter is set to a value of 0 or 1 to determine whether the portamento is according to a fixed period or a variable period. Pressing the VALUE ▲ key in the DATA ENTRY SECTION sets SWEEP to 1, while pressing the ▼ key sets SWEEP to 0.

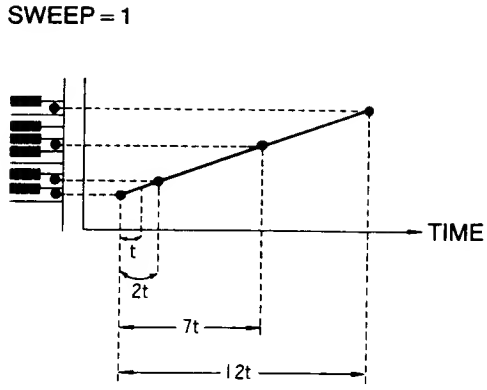
<SWEEP = 0>

This value sets a fixed period portamento. As shown in the illustration, the pitches change over the same period of time for portamento C→G and C→C (one octave higher).



<SWEEP = 1>

This value sets a variable period portamento. As shown in the illustration, the greater the difference in pitch between two notes, the longer the time, so the slower the change in pitch.

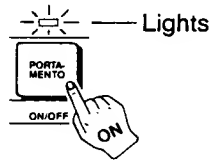


*1 tone is 2t and 1 octave is 12t when the portamento time for a semitone pitch difference is t.

TIME expresses portamento time, which can be set within a range of 00~99. The CURSOR ◀ ▶ keys of the DATA ENTRY SECTION are used to move the cursor to below the TIME values, and then the VALUE ▼ ▲ keys are used to set the value. The higher the value, the longer the portamento time.

② PORTAMENTO ON/OFF

The portamento effect can be switched ON and OFF using the PORTAMENTO ON/OFF key in the OVERALL CONTROL SECTION.

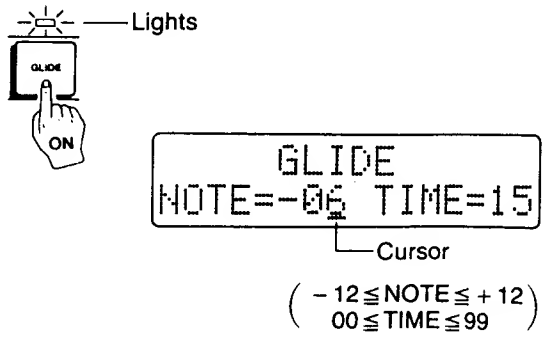


*Setting PORTAMENTO to ON while the SOLO key is ON applies portamento only for legato play (successive key pressed while original key is still held down).
*Portamento and glide cannot be in effect at the same time.

(2) GLIDE

① GLIDE NOTE/TIME SETTING

The LCD will appear as illustrated below when the GLIDE key in the EFFECT SECTION is ON.

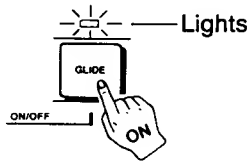


NOTE expresses the amount that the key pressed is off of the standard pitch, and it can be set at semitone steps within a range of one octave (±12 semitones). The glide effect is produced by a change from the preset pitch to the standard pitch, so the larger the preset value, the greater the difference in pitch. TIME expresses the glide time, which can be set within a range of 00~99. The CURSOR ◀ ▶ keys of the DATA ENTRY SECTION are used to move the cursor to below the TIME values, and then the VALUE ▼ ▲ keys are used to set the value. The higher the value, the longer the glide time (the slower the glide).

② GLIDE ON/OFF

The glide effect can be switched ON and OFF using the GLIDE ON/OFF key in the OVERALL CONTROL SECTION.

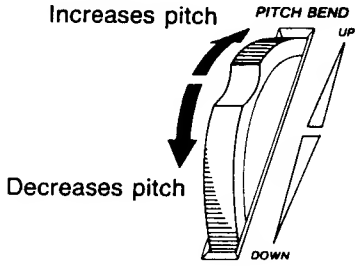
*Portamento and glide cannot be in effect at the same time.



(3) PITCH BEND

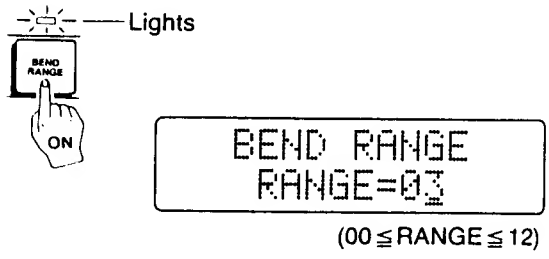
① PITCH BEND WHEEL

The pitch of the keyboard can be controlled manually while playing by operating the PITCH BEND WHEEL.



② BEND RANGE SETTING

The LCD will appear as illustrated below when the BEND RANGE key in the EFFECT SECTION is ON.



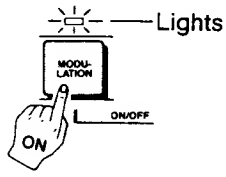
(00≦RANGE≦12)

The PITCH BEND range can be set in semitone units within a range of 00~12 (±1 octave) using the VALUE ▼ ▲ keys in the DATA ENTRY SECTION. Each increase of 1 in the value represents an increase in the bend range of ±100 cents (±semitone).

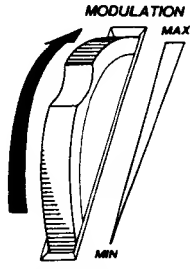
(4) MODULATION WHEEL/ AFTER TOUCH

The depth of the vibrato applied by the CZ-1 can be controlled by the MODULATION WHEEL or the after touch of the keys. Volume can also be controlled by the after touch of the keys.

①-1 MODULATION WHEEL



The depth of the vibrato is increased when the MODULATION WHEEL is rotated forward while the MODULATION ON /OFF key in the OVERALL CONTROL SECTION is ON. At the highest or MAX position, the vibrato applied is in accordance with the value preset by the MOD WHEEL DEPTH in the EFFECT SECTION.

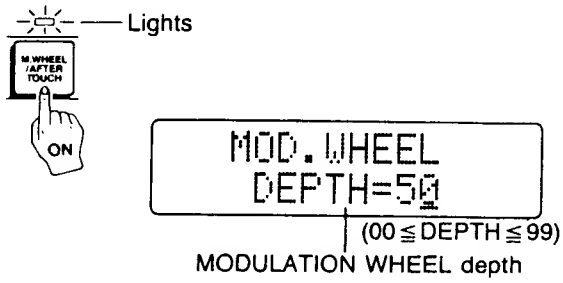


MODULATION WHEEL

*Of the four vibrato parameters (WAVE, DELAY, RATE, DEPTH) in the PARAMETER SECTION, only the DEPTH setting affects the MODULATION WHEEL. The VIBRTATO DEPTH assigned to each tone in memory is applied no matter what the MODULATION WHEEL position when the MODULATION ON/OFF key is set to OFF.

①-2 MODULATION WHEEL DEPTH SETTING

The LCD will appear as illustrated below when the MODULATION WHEEL/AFTER TOUCH key in the EFFECT SECTION is ON.



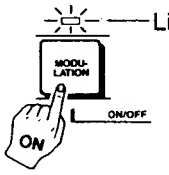
(00≦DEPTH≦99)

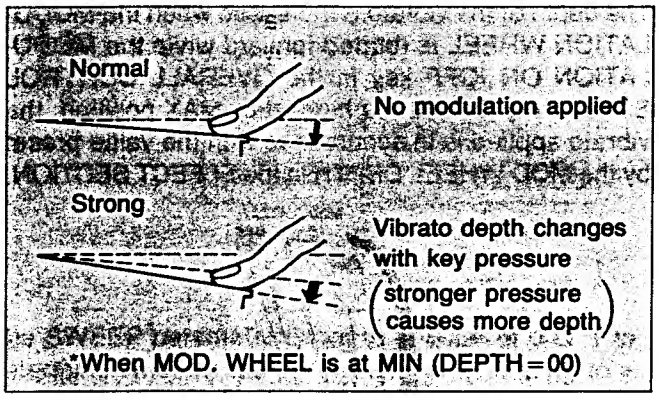
MODULATION WHEEL depth

The MODULATION DEPTH range can be set within a range of 00~99 using the VALUE ▼ ▲ keys in the DATA ENTRY SECTION. The larger the value, the greater the MODULATION DEPTH range.

②-1 AFTER TOUCH MODULATION

The depth of vibrato can be increased by the after touch of the keyboard when the MODULATION ON/OFF key in the OVERALL CONTROL SECTION is ON. Vibrato is applied in accordance with the MODULATION AFTER TOUCH DEPTH set in the EFFECT SECTION when the keys on the keyboard are pressed all the way down.



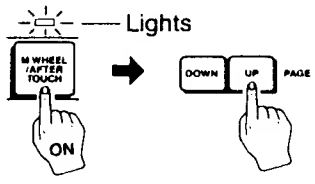


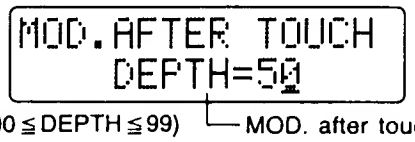
*Of the four vibrato parameters (WAVE, DELAY, RATE, DEPTH) In the PARAMETER SECTION, only the DEPTH setting affects the after touch of the keyboard. The VIBRATO DEPTH assigned to each tone in memory is applied when the MODULATION ON/OFF key is set to OFF.

*The operation with the greatest effect takes priority when the MODULATION WHEEL is operated while strong pressure is applied to the keyboard. However, DEPTH cannot exceed a value of 99.

②-2 MODULATION AFTER TOUCH DEPTH SETTING

The LCD will appear as illustrated below when the MODULATION WHEEL/AFTER TOUCH key in the EFFECT SECTION is ON and the PAGE UP key in the DATA ENTRY SECTION is pressed once.





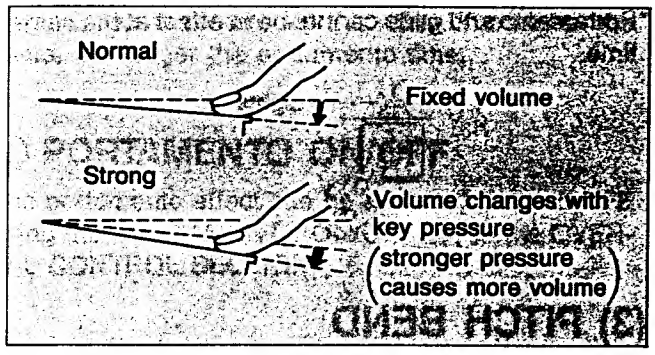
(00≦DEPTH≦99) — MOD. after touch depth

The MODULATION DEPTH range can be set within a range of 00~99 using the VALUE ▼▲ keys in the DATA ENTRY SECTION. The larger the value, the greater the MODULATION DEPTH range.

③-1 AFTER TOUCH VOLUME CONTROL

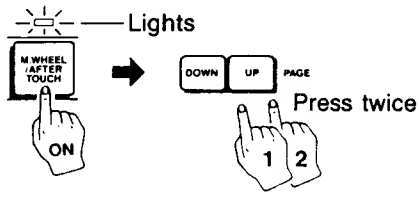
Volume can be controlled by the after touch of the keyboard in accordance with the sensitivity set by the AMP. AFTER TOUCH RANGE in the EFFECT SECTION.

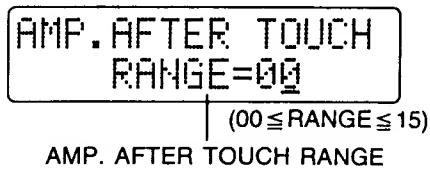
•Modulation and volume can be controlled simultaneously by after touch when the MODULATION ON/OFF key is ON.



③-2 AMP. AFTER TOUCH RANGE SETTING

The LCD will appear as illustrated below when the MODUALTION WHEEL/AFTER TOUCH key in the EFFECT SECTION is ON and the PAGE UP key in the DATA ENTRY SECTION is pressed twice.





(00≦RANGE≦15)

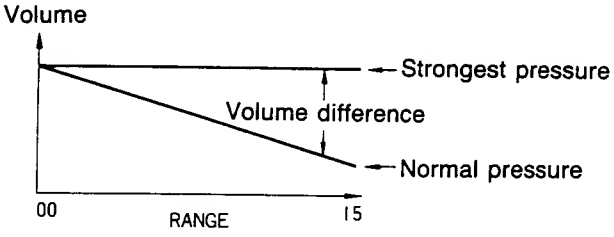
AMP. AFTER TOUCH RANGE

The AMP. (amplification) range can be set within a range of 00~15 using the VALUE ▼▲ keys in the DATA ENTRY SECTION. The larger the value, the greater the AMP. range.

RANGE = 00 ..... No change in volume no matter how strongly the keyboard is pressed.

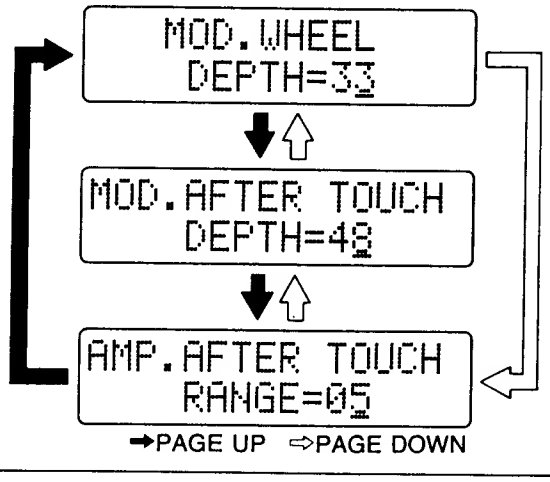
RANGE = 15 ..... Maximum difference in volume between normal and strong keyboard pressure.

*Maximum key pressure results in volume equal to that produced when RANGE = 00 (see illustration).



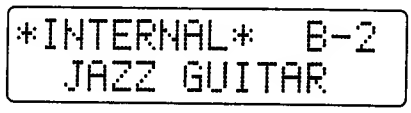
PAGE UP/DOWN FUNCTION

A page display function is employed on the CZ-1 to allow effective setting operations of the various parameters available. When the MODULATION WHEEL/AFTER TOUCH key in the EFFECT SECTION is ON, for example, the page display function allows scrolling among the WHEEL DEPTH, MOD. AFTER TOUCH DEPTH, and AMP. AFTER TOUCH RANGE to set the various parameters. Each press of the PAGE UP or PAGE DOWN key scrolls the displays as illustrated below.

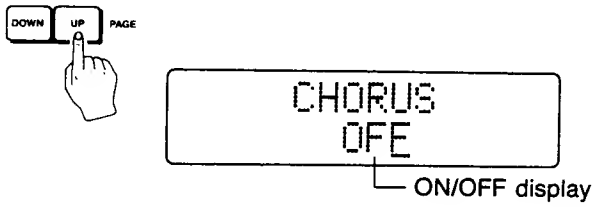


(5) CHORUS ON/OFF

The built-in STEREO CHORUS of the CZ-1 can be switched ON and OFF using the DATA ENTRY SECTION. The strength of the effect applied is adjusted using the CHORUS CONTROL in the OVERALL CONTROL SECTION.
The LCD shows the selected tone number and name in the NORMAL mode when no changes are being made in parameters.



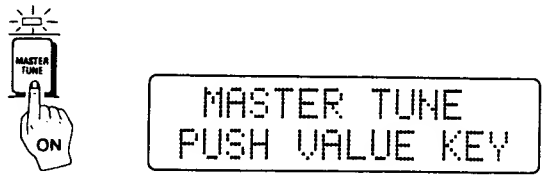
The CHORUS ON/OFF display appears when the PAGE UP or PAGE DOWN key is pressed while this display is being shown.



Either of the VALUE ▼▲ keys can be used to switch the current setting to ON/OFF. When this effect is ON, the same chorus effect is applied to all tones in accordance with the CHORUS CONTROL setting in the OVERALL CONTROL SECTION.

(6) MASTER TUNE

The LCD will appear as illustrated below when the MASTER TUNE key in the OVERALL CONTROL SECTION is ON.

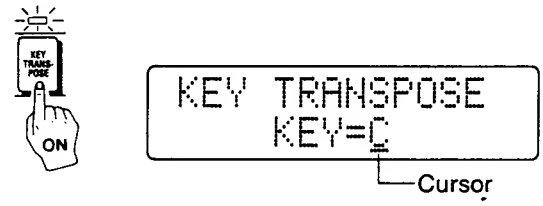


Each press of the VALUE ▲ key in the DATA ENTRY SECTION raises the pitch by 1.7 cents, while each press of the ▼ key lowers the pitch by 1.7 cents.

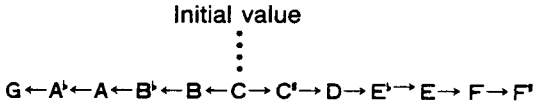
Simultaneously pressing the ▼▲ VALUE keys returns the MASTER TUNE value to its initialized value (A4 = 442Hz).

(7) KEY TRANSPOSE

The LCD will appear as illustrated below when the KEY TRANSPOSE key in the OVERALL CONTROL SECTION is ON.



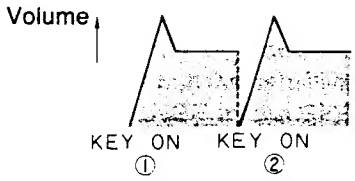
Each press of the VALUE ▲ key in the DATA ENTRY SECTION raises the key by one semitone, while each press of the ▼ key lowers the pitch by one semitone.



(8) SOLO

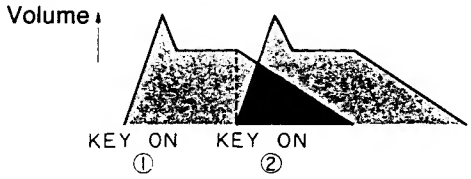
The keyboard of the CZ-1 becomes monophonic when the SOLO key is ON, and the last keyboard key pressed is given priority.

SOLO key ON



KEY ON 1 cut when KEY ON 2 starts

SOLO key OFF

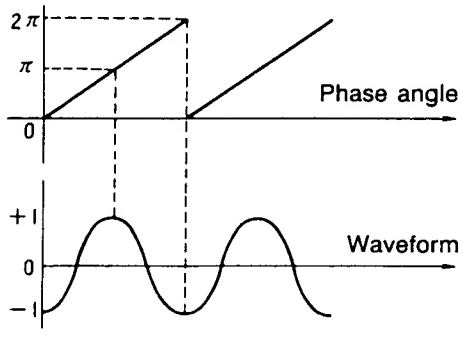


KEY ON 1 continues even when KEY ON 2 starts (figure shows attenuating tones)

1-5 PD (PHASE DISTORTION) SOUND SOURCE

The CZ-1 employs a unique, CASIO developed PD (Phase Distortion) sound source system. This system is capable of producing a variety of wave forms by distorting the read phase angles of sine and cosine waves that are written in ROM. The pattern of the read phase angle distortion is determined by the specification of the DCO (VCO of analog synthesizer) WAVE FORM. The magnitude (modulation depth) of the read angle distortion corresponds to the momentary value of the DCW (VCF of analog synthesizer) envelope.

(Fig. 1)

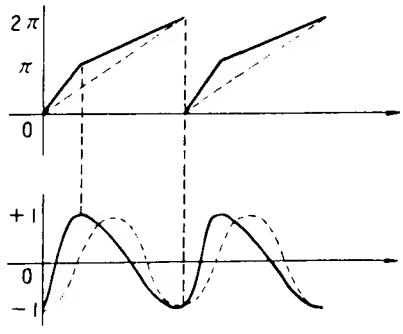


Polarity (+/−) cosθ reversed for sake of example.

Fig. 1 illustrates output of a non-distorted cosine wave when a cosine wave in ROM is read with a linear phase angle. The phase angle is read at a constant speed from 0 through 2π.

What would happen if we increase the phase angle read speed from 0 through π and decrease it from π through 2π?

(Fig. 2)



As shown in Fig. 2, the phase angle read is distorted rather than linear, and the output cosine wave takes on what is close to a saw-tooth pattern.
What would happen now if we further increase the phase angle read speed from 0 through π and decrease it from π through 2π?

(Fig. 3)

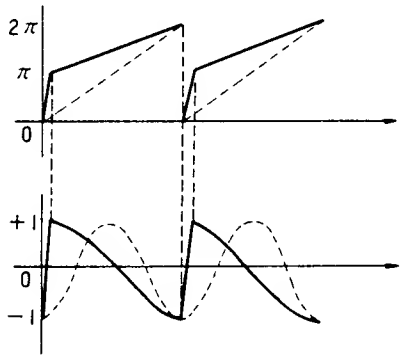
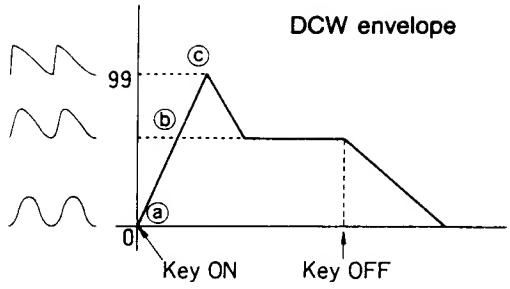


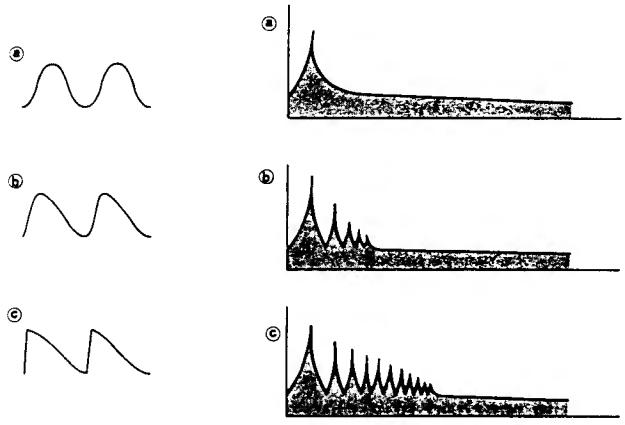
Fig. 3 shows that the output cosine wave is almost a perfect saw-tooth pattern.

The revolutionary PD sound source system thus makes it possible to output waveforms that differ from cosine waves by simply distorting the cosine (or sine) wave read from ROM.
Figs. 1 through 3 illustrate the patterns produced by increasing the phase angle read speed from 0 through π while decreasing the speed from π through 2π. This is the pattern effected when the SAW-TOOTH waveform is selected in the DCO parameter.
Read phase angles are also distorted in accordance with the selection of the other DCO parameter WAVE FORMs, thus making a variety of waveform outputs possible.
The magnitude of the read phase angle distortion corresponds to the momentary value (change over time) of the DCW envelope. When the DCW envelope is set as shown in Fig. 4, an undistorted cosine wave is output at point ⓐ, distortion reaches its peak at point ⓒ, and a saw-tooth pattern as shown in Fig. 3 is output. Distortion is reduced (modulation becomes shallower) at point ⓑ, and a pattern that is somewhere between a cosine wave and a saw-tooth wave as illustrated in Fig. 2 is output.

(Fig. 4)



When WAVE FORM is set to saw-tooth.



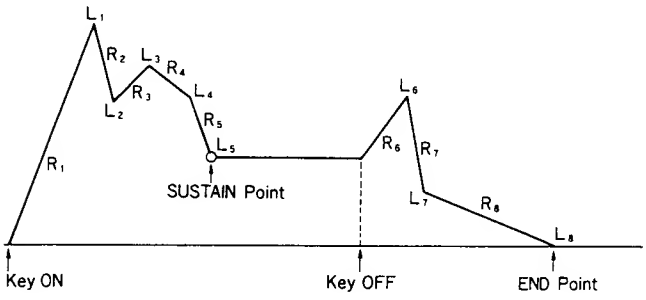
POINTS TO REMEMBER

1) The pattern of the read phase angle distortion corresponds to the WAVE FORM setting of the DCO parameter.
2) The magnitude of the read output phase angle distortion (modulation depth) corresponds to the momentary value of the DCW envelope.

1-6 8-STEP ENVELOPES

The CZ-1 features a dual system DCO/DCW/DCA, and each system has its own independent envelope generator for control of changes in notes, timbres and volume over time. The envelope generators can set up to eight steps including setting of the sustain point (the level at which a note is sustained while a key is depressed). This provides greater versatility than the conventional ADSR generator and makes sound creation possibilities virtually unlimited.

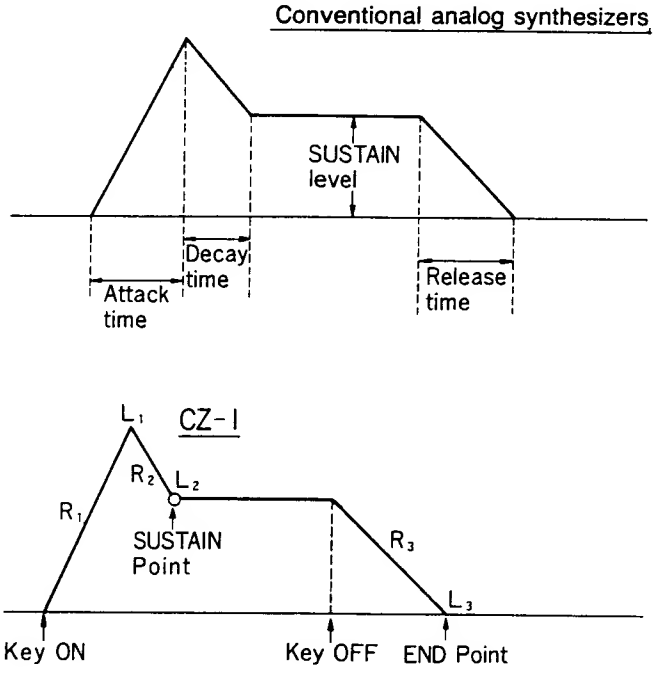
(Fig. 5)



*R_1 through R_8 indicate the RATE (slope) of each various step, while L_1 through L_8 indicate the LEVEL (destination level). L_1 is reached at a slope of R_1 in STEP 1, L_2 is reached at a slope of R_2 in STEP 2, etc.

Fig. 5 shows an example of an envelope employing 8 steps. There are two attacks before the sustain point, as well as a third attack after the key is released, resulting in an "after-envelope".

(Fig. 6)

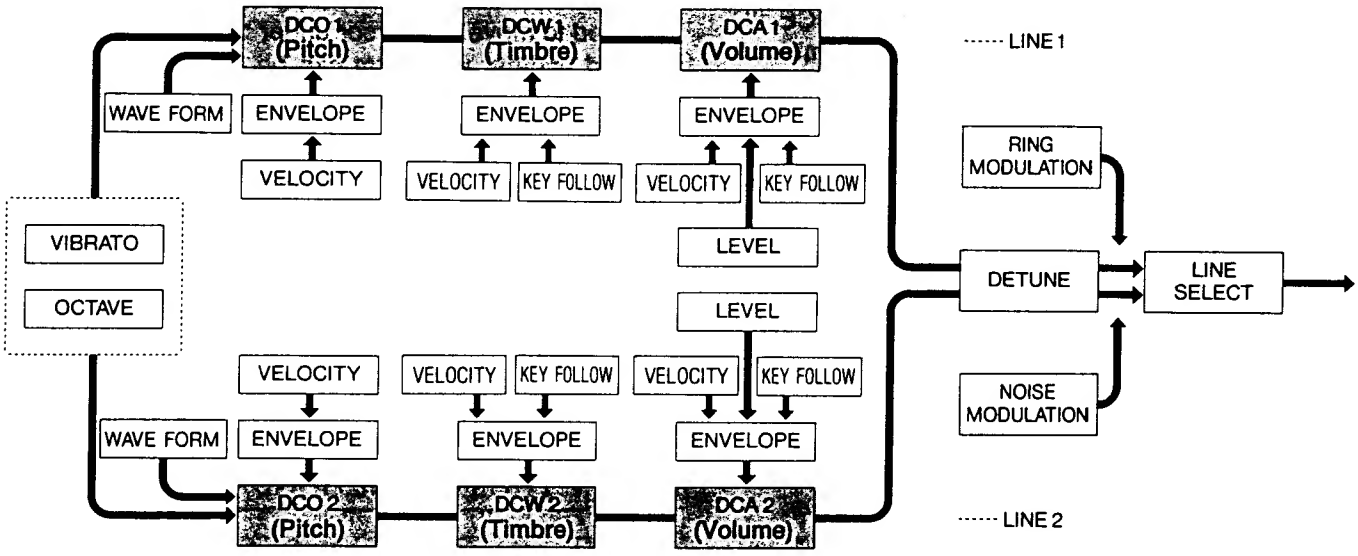


Analog synthesizers usually require the setting of envelopes according to 4 parameters: Attack time, Decay time, Sustain level and Release time (hence, the name ADSR system). With the envelope generator of the CZ-1, only 3 step settings are required to attain the same effect.

1-7 BLOCK CONFIGURATION

The PD sound source of the CZ-1 makes it a fully digital synthesizer. Actually, however, the DCO (pitch and basic waveform setting), DCW (timbre control), and DCA (volume control) digital circuits of the Parameter Section result in a block configuration that closely resembles an analog synthesizer. The block configuration of the CZ-1 consists of LINE 1 and LINE 2 which make up a dual system. DETUNE allows you to create differences between the sounds generated by LINE 1 and 2 to produce subtle nuances. With LINE SELECT, a single line can be output or combined with the detuned line for a total of 4 line output settings.

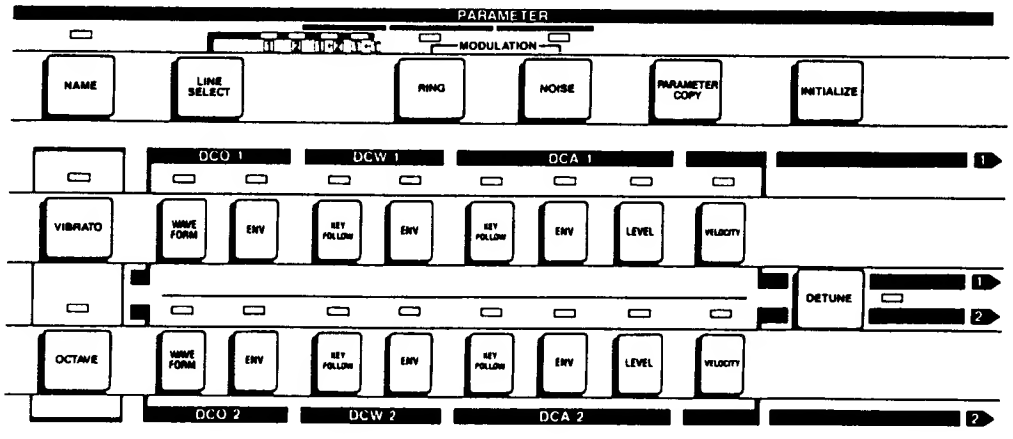
CZ-1 block configuration



ENVELOPE ....
Digital envelope generator (DEG) that sets envelopes with up to 8 steps. Two lines consisting of DCO, DCW, and DCA result in a total of 6 independent envelopes.

VELOCITY ....
Parameter which sets the degree of change in the envelope level according to the key touch pressure. Independent settings are possible for DCO, DCW, and DCA of both lines.

LEVEL ....
Parameter that independently sets the volume level for LINE 1 and LINE 2.



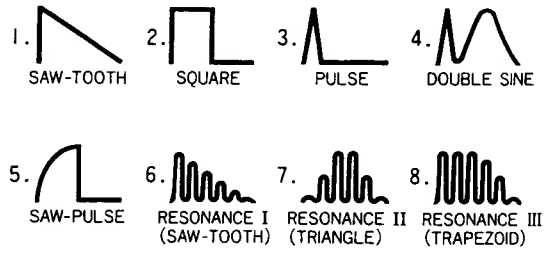
1-8 DCO (DIGITAL CONTROLLED OSCILLATOR)

DCO corresponds to the VCO of an analog synthesizer, and is comprised of WAVE FORM for selection of the basic waveform and ENV (pitch envelope) for control of the pitch over time for a pressed key. The dual system line provides an independent DCO 1 and DCO 2 which can be used as desired.

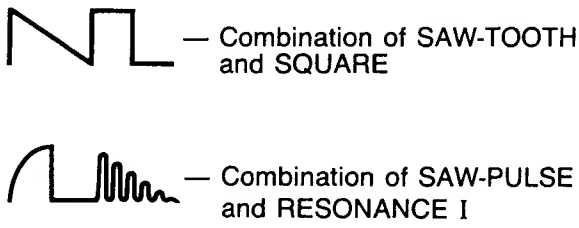
•WAVE FORM

Determines the basic waveform of a tone. Independent settings can be made using the DCO 1 and DCO 2 keys.
As can be seen in Fig. 8, there are eight types of basic waveforms: from SAW-TOOTH to RESONANCE III. Any one of these eight waveforms can be combined as shown in Fig. 9 to produce a total of 33 waveforms suitable for virtually any application.

(Fig. 8)



(Fig. 9)



*The three RESONANCE waveforms cannot be used in combination with each other.

When the WAVEFORM key is ON, the LCD appears as shown in Fig. 10.

(Fig. 10)

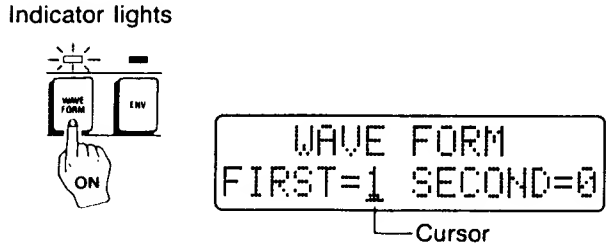


Fig. 10 indicates that only the saw-tooth pattern is selected. (Only the FIRST waveform is applied when SECOND = 0 is displayed.) At this time, the VALUE keys can be used to set FIRST (the current position of the cursor) to a value from 1 through 8 to select the required waveform. Then the CURSOR keys can be used to move the cursor under the value of SECOND and another waveform can be set using the VALUE keys (see Fig. 11).
This procedure is used to select one of the 33 combinations of basic waveforms.

(Fig. 11)

① Either of the CURSOR keys is used to move the cursor.



② The VALUE keys are used to change the numeric value.

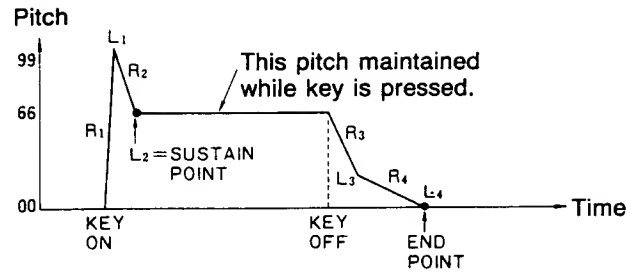


*Giving the same value to FIRST and SECOND is the same as when SECOND = 0.
*FIRST = 1, SECOND = 2 produces the same effect as FIRST = 2, SECOND = 1.

•DCO ENVELOPE (PITCH ENVELOPE)

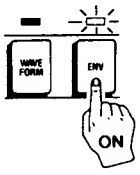
DCO controls changes in pitch over time. Independent envelopes can be set using the DCO 1 and DCO 2 ENV keys.
The PITCH envelope sets the change in pitch over time up to 8 levels for pressed keys in accordance with the RATE and LEVEL.
Now let's set up an actual 4-step envelope as shown in Fig. 12.

(Fig. 12)



	STEP 1	STEP 2	STEP 3	STEP 4
RATE	99	72	60	20
LEVEL	99	66	24	00
SUS, END	***	SUS	***	END

① When the ENV key of the DCO 1 or DCO 2 is pressed, the following appears on the LCD.



SUS will be displayed if the displayed STEP is a sustain point.
END will be displayed if it is an end point.

Pitch envelope STEP 1 selected.

```
PITCH STEP1  ***
RATE=m1m2 LEVEL=n1n2
```

$(00 \leqq m_1m_2 \leqq 99,\ 00 \leqq n_1n_2 \leqq 99)$

Destination level of step 1.

Rate of step 1.

② Use the ▲ VALUE key to raise the RATE value to 99.

```
PITCH STEP1  ***
RATE=99 LEVEL=n1n2
```

③ Use either one of the CURSOR keys to move the cursor under the LEVEL value. Use the ▲ VALUE key to raise the LEVEL value to 99. This completes the setting of STEP 1.

```
PITCH STEP1  ***
RATE=99 LEVEL=99
```

④ Use the PAGE UP key to advance to STEP 2. After ensuring the STEP 2 is displayed, follow the same procedures outlined for STEP 1 to set the RATE to 72 and the LEVEL to 66.

```
PITCH STEP2  ***
RATE=72 LEVEL=66
```

⑤ Press the ENV POINT SUSTAIN key to designate STEP 2 as a SUSTAIN POINT.

SUSTAIN POINT

```
PITCH STEP2  SUS
RATE=72 LEVEL=66
```

⑥ Use the PAGE UP key to advance to STEP 3 and set the RATE to 60 and the LEVEL to 24.

```
PITCH STEP3  ***
RATE=60 LEVEL=24
```

⑦ Use the PAGE UP key to advance to STEP 4 and set the RATE to 20. Then press the ENV POINT END key to set the END POINT, and the LEVEL will automatically be set to 00.

*It is not necessary to press the END key if the END POINT is already set.

END POINT

```
PITCH STEP4  END
RATE=20 LEVEL=00
```

LEVEL of the last step is 00.

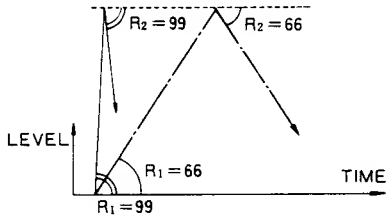
NOTES

- Even if the PAGE UP key is pressed, it will be impossible to advance from the present step if END POINT is specified. In this case, press the ENV POINT END key again to cancel the END point and then press the PAGE UP key. If an END point is cancelled within STEP 1 through 7, an END POINT is automatically designated in STEP 8 and previously set data is automatically restored.
- The LEVEL for a STEP that includes an END POINT is fixed as 00 and cannot be changed.
- When a SUSTAIN POINT is designated in a STEP, SUSTAIN POINTs which are set in other STEPs are cancelled.

RATE/LEVEL NUMERIC VALUES

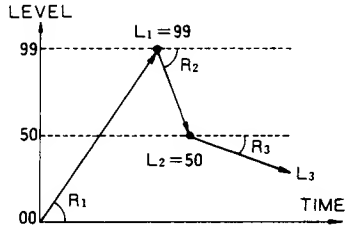
RATE

The RATE indicates the slope (interior angle in relation to horizontal) of each step in the envelope. R = 99 indicates nearly 90° while R = 0 indicates nearly 0°. Since the value used is an absolute value, the slope increases and decreases in direct proportion with the value of R, regardless of whether the pattern shows a rise or fall. This means that a steep incline results in a quick level change while a gentle incline results in a slow level change.



LEVEL

The LEVEL indicates up to what point each step rises or falls (destination level), and the range is from 00 through 99. For the DCO envelope, LEVEL means the pitch height, and a value of 00 is the pitch of a pressed key. For the DCW envelope, L = 99 results in a basic waveform. For the DCA envelope, LEVEL means the volume.



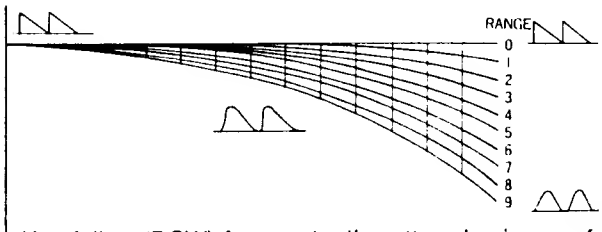
1-9 DCW (DIGITAL CONTROLLED WAVE)

DCW corresponds to the VCF of an analog synthesizer, and is comprised of KEY FOLLOW for control of the waveform corresponding to the keyboard range, and ENV (wave envelope). The dual system line provides an independent DCO 1 and DCO 2 which can be used as desired.

•KEY FOLLOW/DCW

This parameter applies a different change in the DCW envelope level in accordance with the pitch of the key played. The DCW 1 and DCW 2 KEY FOLLOW keys are used to independently set each key follow.
Key follow can be set to levels ranging from 0 through 9. The higher the note played, the closer, the waveform comes to being a sine (cosine) wave. (See Fig. 13.)

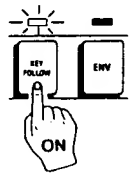
(Fig. 13)



Key follow (DCW) for saw-tooth pattern basic waveform.

The LCD appears as in Fig. 14 when the DCW KEY FOLLOW key is pressed.

(Fig. 14)





$(0 \leqq n \leqq 9)$

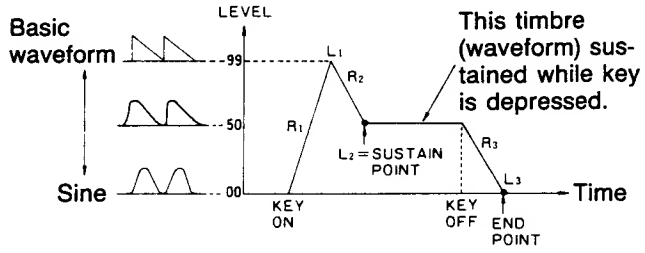
The VALUE keys in the Data Entry Section are used to set the RANGE value within a range of 0 through 9. The greater the RANGE value the greater the waveform level variance (timbre change rate) in the upper registers. A setting of 9 represents the maximum variance.



•DCW (WAVE) ENVELOPE

This parameter controls the timbre (waveform) change over time, and the DCW 1 and DCW 2 ENV keys are used to independently set the timbre envelopes. The timbre envelope is used to set the timbre (waveform) change over time for a pressed key in accordance with the RATE (slope) and LEVEL (destination level). Settings can be made to a maximum of 8 steps.

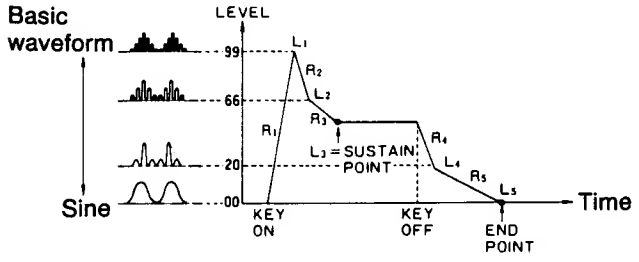
(Fig. 15) WAVE FORM 1 (Saw-tooth)



	STEP 1	STEP 2	STEP 3
RATE	75	60	60
LEVEL	99	50	00
SUS, END	***	SUS	END

The change of timbre over time is in accordance with the DCW envelope LEVEL. A sine wave is attained when L3 = 00 and the basic waveform is attained when L3 = 99.

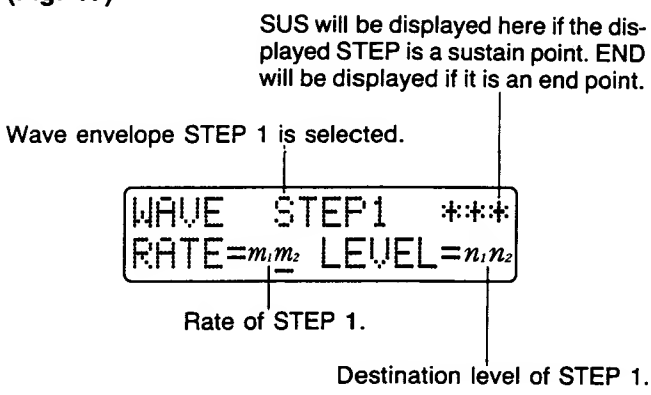
(Fig. 16) WAVE FORM 7 (RESONANCE II)



	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
RATE	90	75	45	90	30
LEVEL	99	66	50	20	00
SUS, END	***	***	SUS	***	END

The LCD appears as in Fig. 19 when the DCW 1 or DCW 2 ENV key is ON.

(Fig. 17)



*Operational procedures are identical to those previously explained for the DCO envelope (page 25). Data is set using the VALUE, CURSOR, PAGE UP/PAGE DOWN and ENV POINT SUSTAIN/END keys.

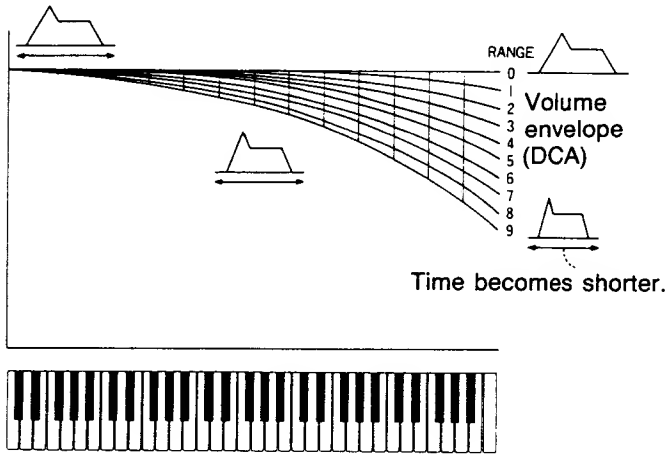
1-10 DCA (DIGITAL CONTROLLED AMPLIFIER)

DCA corresponds to the VCA of an analog synthesizer and independent volume envelopes can be set using the DCA 1 and DCA 2 ENV keys.

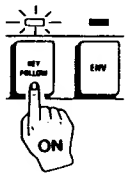
•KEY FOLLOW/DCA

This is the parameter that applies a variance to the DCA envelope in accordance with the pitch of the key played. The DCA 1 and DCA 2 KEY FOLLOW keys are used to independently set each key follow.
The higher the note played, the shorter the time of the volume envelope.

(Fig. 18)



The LCD appears as in Fig. 19 when the DCA KEY FOLLOW key is pressed.



(Fig. 19)



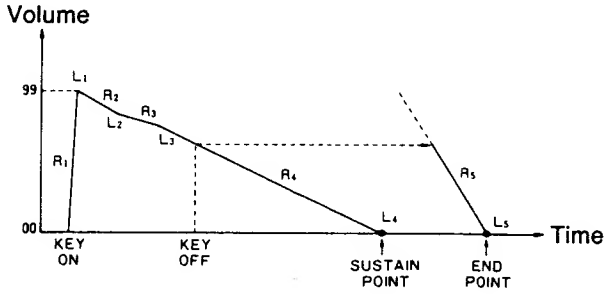
$(0 \leq n \leq 9)$

The VALUE keys are used to set the RANGE value within a range of 0 through 9. The greater the RANGE value the greater the time variance in the upper registers. A setting of 9 represents the largest variance.

•DCA (AMP) ENVELOPE

This is the parameter that controls volume change over time, and the DCA 1 and DCA 2 ENV keys are used to independently set the volume of the envelopes. The volume change over time of a pressed key is set in accordance with the RATE (slope) and LEVEL (destination level). Settings can be made to a maximum of 8 steps.

(Fig. 20) Piano amp envelope

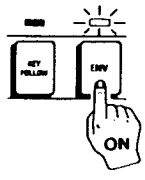


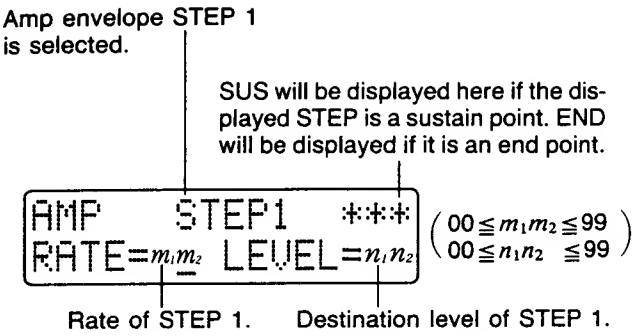
	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
RATE	99	35	20	25	55
LEVEL	99	80	70	00	00
SUS, END	***	***	***	SUS	END

This is an example of a piano envelope where the sound produced by a pressed key gradually decreases. If the key is released before the sound is completely attenuated, the sound quickly decreases. If the key is released before the SUSTAIN POINT is reached, the envelope jumps to the last step in which the END POINT is specified.

The LCD appears as in Fig. 21 when the DCA 1 or DCA 2 ENV key is ON.

(Fig. 21)





Operational procedures are identical to those previously explained for the DCO envelope (page 25). Data is set using the VALUE, CURSOR, ENV STEP and ENV POINT SUSTAIN/END keys.

1-11 VELOCITY

Velocity is a parameter that controls volume, timbre and pitch in accordance with the pressure (initial touch) applied to the keys on the keyboard. There are three types of velocity forming a system which changes the all envelope levels.

① AMP VELOCITY

Changes the levels of each step of the volume envelope in accordance with the pressure applied.

② WAVE VELOCITY

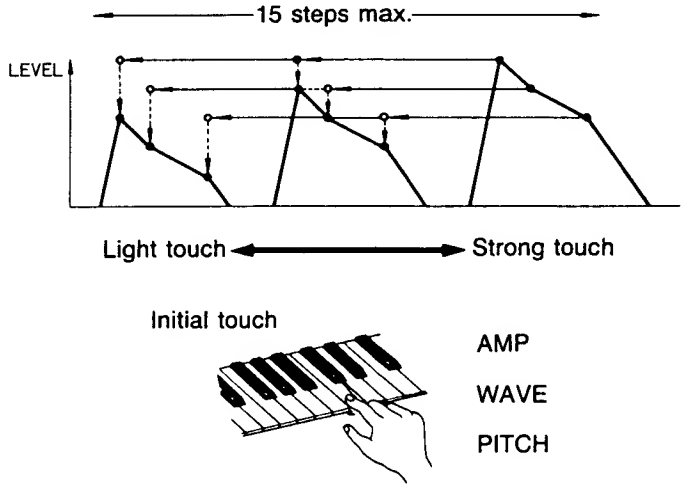
Changes the levels of each step of the timbre envelope in accordance with the pressure applied.

③ PITCH VELOCITY

Change the levels of each step of the pitch envelope in accordance with the pressure applied.

The three types of velocity for LINE 1 and LINE 2 are set independently by the VELOCITY key. The degree of change for the envelopes in accordance with key touch pressure can be set to one of 15 levels. The preset envelope level specified for DCA, DCW and DCO is reached when key pressure is at its maximum. Each envelope level is progressively lowered as key-touch pressure becomes weaker (see Fig. 22). The greater the velocity degree setting, the greater the change caused by different key touch pressure.

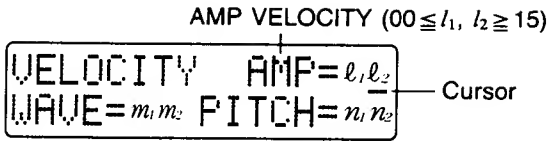
(Fig. 22)



•AMP VELOCITY

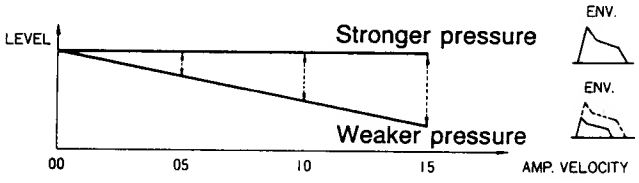
Increases volume as key touch pressure becomes stronger and decreases volume when key touch is weaker. The LCD appears as illustrated in Fig. 23 when the VELOCITY key for LINE 1 or LINE 2 in the PARAMETER SECTION is ON.

(Fig. 23)



The AMP VELOCITY can be set to a value within the range of 00 through 15 using the VALUE ▼▲ keys in the data entry section. A value of 00 results in a fixed volume* regardless of the key touch pressure. The difference in volume caused by key touch pressure becomes greater as the value increases, with the greatest difference being caused by a value of 15.
*Amp envelope set by DCA.

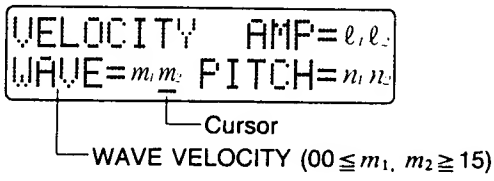
(Fig. 24) Relation between AMP VELOCITY and AMP ENVELOPE



•WAVE VELOCITY

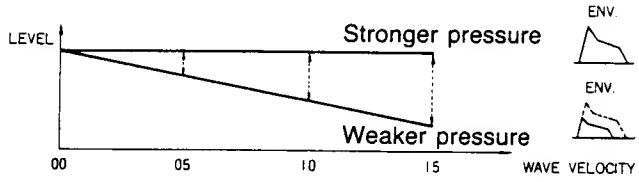
Increases high harmonic components as key touch pressure becomes stronger and decreases high harmonic components when key touch is weaker. The LCD appears as illustrated in Fig. 25 when the VELOCITY key for LINE 1 or LINE 2 in the PARAMETER SECTION is ON, and the cursor is moved to the WAVE VELOCITY values using the CURSOR ▶◀ keys.

(Fig. 25)



The WAVE VELOCITY can be set to a value within the range of 00 through 15 using the VALUE ▼▲ keys in the data entry section. A value of 00 results in a fixed timbre regardless of the key touch pressure. The difference in timbre caused by key touch pressure becomes greater as the value increases, with the greatest difference being caused by a value of 15.
*Wave envelope set by DCW.

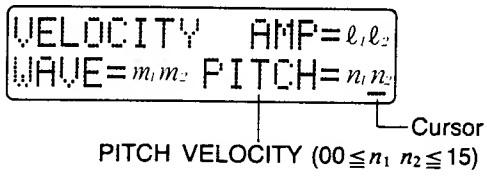
(Fig. 26) Relation between WAVE VELOCITY and WAVE ENVELOPE



•PITCH VELOCITY

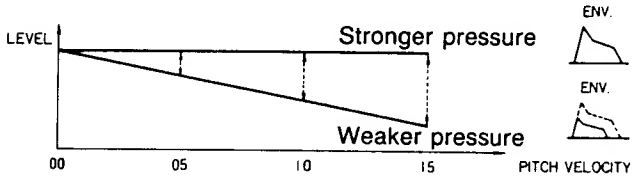
Increases change in pitch as key touch pressure becomes stronger and decreases change in pitch when key touch is weaker. The LCD appears as illustrated in Fig. 27 when the VELOCITY key for LINE 1 or LINE 2 in the PARAMETER SECTION is ON, and the cursor is moved to the PITCH VELOCITY values using the CURSOR ▶◀ keys.

(Fig. 27)



The PITCH VELOCITY can be set to a value within the range of 00 through 15 using the VALUE ▼▲ keys in the data entry section. A value of 00 results in a fixed pitch regardless of the key touch pressure. The difference in pitch caused by key touch pressure becomes greater as the value increases, with the greatest difference being caused by a value of 15.
*Pitch envelope set by DCO.

(Fig. 28) Relation between PITCH VELOCITY and PITCH ENVELOPE



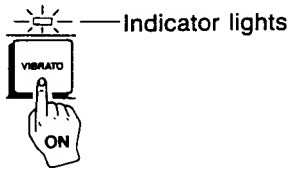
This completes the explanation of the DCO, DCW and DCA blocks. The most important point to remember is *that these three blocks interact with each other to form a single tone.* Actual tone creation examples are given in the SOUND DATA BOOK.

1-12 VIBRATO/OCTAVE

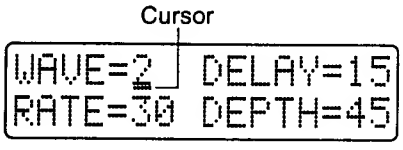
VIBRATO and OCTAVE are parameters which are dependent upon the DCO tone control. VIBRATO sets the vibrato effect, while OCTAVE sets the octave shift.

•VIBRATO

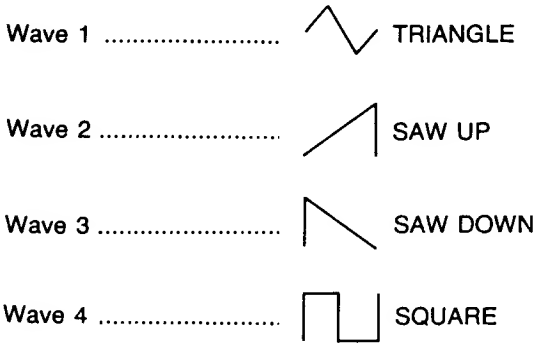
VIBRATO corresponds to the LFO of an analog synthesizer, and it oscillates the low frequencies of the DCO to apply a vibrato effect. This key is used to set 4 parameters: WAVE, DELAY, RATE and DEPTH. The LCD appears as in Fig. 29 when the VIBRATO key is pressed.



(Fig. 29)



① WAVE is the parameter that selects the vibrato waveform, and is set to a value in the range of 1 through 4 using the VALUE keys. The 4 waveforms are as follows:



② DELAY is the parameter that sets the time from when a key is pressed until the point at which vibrato is applied. DELAY is set to a value in the range of 00 through 99 using the VALUE keys after the cursor is moved to the proper position with the CURSOR keys. The larger the value, the later vibrato is applied.

③ RATE is the parameter that sets the period (speed) of the vibrato. RATE is set to a value in the range of 00 through 99 using the VALUE keys after the cursor is moved to the proper position with the CURSOR keys. The larger the value, the faster the vibrato.

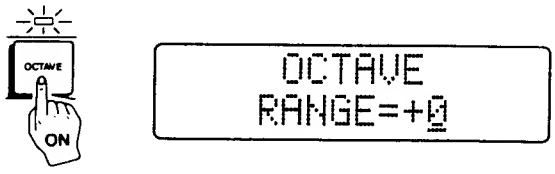
④ DEPTH is the parameter that sets the depth of the vibrato. DEPTH is set to a value in the range of 00 through 99 using the VALUE keys after the cursor is moved to the proper position with the CURSOR keys. The larger the value, the deeper the vibrato.

•OCTAVE

This parameter is used to raise and lower pitch by one octave, and each timbre can be set to a suitable pitch.

The LCD appears as in Fig. 30 when the OCTAVE key is ON.

(Fig. 30)



The VALUE keys in the Data Entry Section are used to set the OCTAVE RANGE to a value of +1 (one octave up), 0 or −1 (one octave down).

*The initial data settings for each preset and internal memory tone also include an OCTAVE RANGE setting.

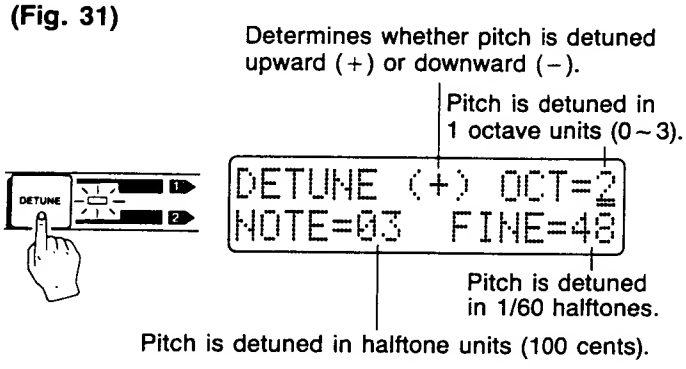
1-13 DETUNE/LINE SELECT

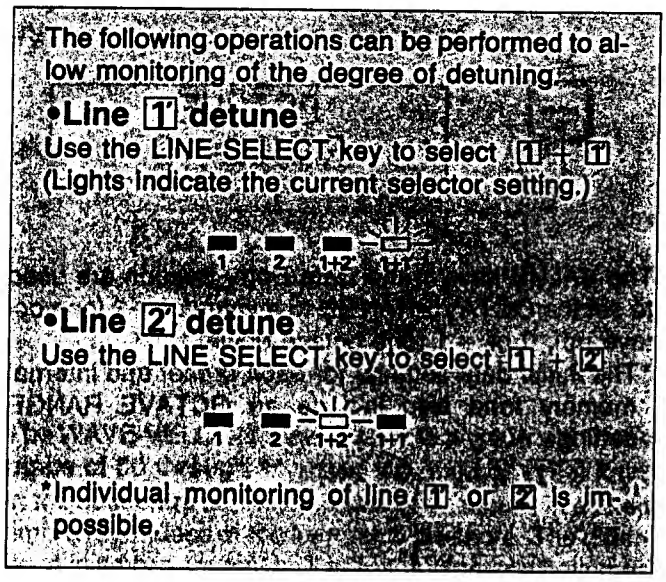
DETUNE and LINE SELECT play very important roles in the tone creation capabilities of the CZ-1. The parameters make it possible to combine tones created on LINE 1 with those on LINE 2, to detune the pitches between the two lines for mellower sound, and to apply other subtle nuances to tones.

•DETUNE

The pitch between different tones in DCO 1 and DCO 2 can be detuned, the DCO 2 tone pitch only can be detuned, or a DCO 1 with detuned pitch can be used in combination with a pitch that has not been detuned for the creation of a chorus effect. The result of a detuned Line [1] DCO is referred to as [1], while that of a detuned Line [2] DCO is [2].
The LCD appears as in Fig. 31 when the DETUNE key is ON. (The cursor is located below the OCT value.)

(Fig. 31)





① Determining the detune direction (up/down)

Use the CURSOR keys to move the cursor under the (+/−) indicator and the VALUE keys to change between plus and minus. Set to + to raise pitch and to − to lower pitch.

② Detuning in 1 octave units

Move the cursor under the OCT value and use the VALUE keys to change the value within a range of 0 through 3. The pitch can be raised or lowered up to 3 octaves in one octave units.

③ Detuning in half tone (100 cents) units

Move the cursor under the NOTE value and use the VALUE keys to change the value within a range of 0 through 11. The pitch can be raised or lowered up to 11 (100 cents).

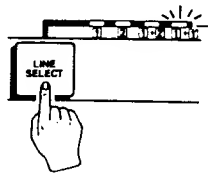
④ Fine detune

Move the cursor under the FINE value and use the VALUE keys to change the value within a range of 0 through 60. The pitch can be raised or lowered up to 1/60 half tones (approximately 1.7 cents).

*Using data ① through ④ in combination makes it possible to detune within a range of ±4 octaves. If OCT, NOTE and FINE are all set to 0, LINE [1] = LINE [1] and LINE [2] = LINE [2].

•LINE SELECT

This function makes it possible to select the best line combination for the type of sound being produced. The data settings for each preset and internal memory tone also include LINE settings.
The line setting changes in the following order each time the LINE SELECT key is pressed:



•Line select [1]

16-note polyphonic for creation of simple sounds.

•Line select [2]

16-note polyphonic for monitoring LINE [2] during [1] + [2] tone creation.

•Line select [1] + [2]

8-note polyphonic for creating sounds with complex harmonics structures. Same as [1]+[2] when all detune values (OCT, NOTE, FINE) are set to 0.

•Line select [1] + [1']

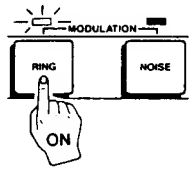
8-note polyphonic for ensemble and chorus effects. Same as [1] + [1] when all detune values (OCT, NOTE, FINE) are set to 0.

*When more than 8 keys are pressed in 8-note polyphonic, the most recently pressed keys are usually given priority.

1-14 RING/NOISE MODULATION

•RING MODULATION

Pressing the RING key causes an indicator to light above the key and LINE [1] and LINE [2] output is ring modulated by LINE [1]. Pressing the RING key again will turn the function OFF. Ring modulation is only possible when LINE SELECT is set to [1] + [2] or [1] + [1']. Ring modulation is used when creating bell-type sounds.



•NOISE MODULATION

Pressing the NOISE key causes an indicator to light above the key and LINE [1'] or LINE [2'] output is modulated by noise. Pressing the NOISE key again will turn the function OFF. Noise modulation is only possible when LINE SELECT is set to [1] + [2] or [1] + [1']. Noise modulation is used when creating wind or percussion sounds.

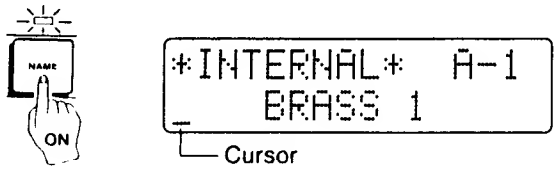
*The RING and NOISE keys mutually cancel each other.

1-15 NAME

This parameter makes it possible to write names up to 16 characters long for tones.

Pressing the NAME key causes an indicator to light above the key to indicate that this function is ON. At this time, a cursor will appear on the left side of the LCD on the tone name line (see Fig. 32), indicating that a new name can be written for the tone.

(Fig. 32)



The cursor is moved to the input position on the line using the CURSOR ◀▶ keys in the DATA ENTRY SECTION. Actual writing of the tone name is performed using the MEMORY BANK key (A~H) and the MEMORY NO. keys (1~8) in the PROGRAMMER SECTION.
Each key is assigned two or three characters, and the character written depends upon how many times the key is pressed. The following letters, numbers and symbols can be input:

① 26 alphabetic characters (A~Z)
② Numbers (0~9)
③ Symbols (period, hyphen, slash, space)

(EXAMPLE 1)

BANK [A] key
1st press → A
2nd press → I
3rd press → Q
4th press → A

A key	A	I	Q
B key	B	J	R
C key	C	K	S
D key	D	L	T
E key	E	M	U
F key	F	N	V
G key	G	O	W
H key	H	P	X

(EXAMPLE 2)

MEMORY [5] key
1st press → 5
2nd press → •
3rd press → 5

Press the NAME key again to switch this function OFF (indicator goes out) when input is complete.

1 key	1	Y
2 key	2	Z
3 key	3	9
4 key	4	0
5 key	5	•
6 key	6	—
7 key	7	/
8 key	8	(BLANK)

16 PARAMETER COPY

Waveform, envelope and velocity data can be copied between the DCO, DCW and DCA parameters of the two lines.

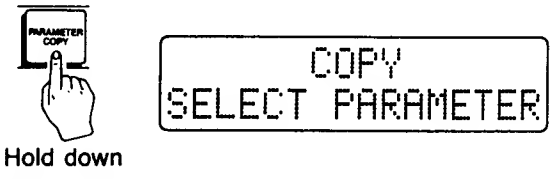
While holding down the PARAMETER COPY key, press the key for the parameter which is the origin of the data. Then, still holding down the PARAMETER COPY key, press the key for the parameter which is the destination of the data.

(EXAMPLE)

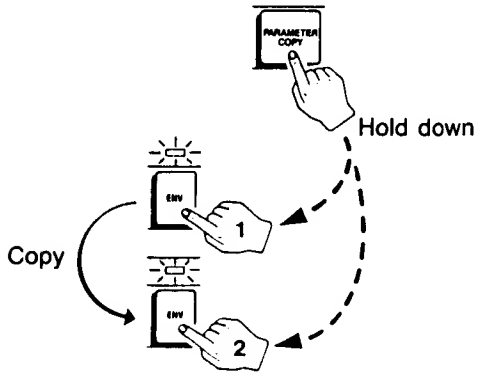
Copy DCA1 ENVELOPE data to the DCA2 parameter.

① Press (and hold down) the PARAMETER COPY key and the display should appear as illustrated in Fig. 33.

(Fig. 33)



② While holding down the PARAMETER COPY key, press the DCA1 ENVELOPE key followed by the DCA2 ENVELOPE key. At this time, the LCD should show STEP 1 of the DCA2 ENVELOPE indicating that copying is complete (Fig. 34).



(Fig. 34)



The procedure outlined above copies all of the data DCA1 ENVELOPE data to the DCA2 ENVELOPE parameter. Of course, reversing the procedure in step 2 would result in data being copied from DCA2 to DCA1.
The following lists the data that can be copied between the two lines.

LINE 1	COPY	LINE 2
WAVE FORM	↔	WAVE FORM
ENVELOPE (DCO)	↔	ENVELOPE (DCO)
KEY FOLLOW (DCW)	↔	KEY FOLLOW (DCW)
ENVELOPE (DCW)	↔	ENVELOPE (DCW)
KEY FOLLOW (DCA)	↔	KEY FOLLOW (DCA)
ENVELOPE (DCA)	↔	ENVELOPE (DCA)
LEVEL	↔	LEVEL
VELOCITY	↔	VELOCITY

1-17 INITIALIZE

This function returns parameters to their initial settings. The key that corresponds to the parameter to be initialized is pressed while the INITIALIZE key is held down. The LCD will then show the initialized status of the selected parameter.

(EXAMPLE 1)

Initializing VIBRATO

① Press and hold down the INITIALIZE key.

② Simultaneously press the VIBRATO key.







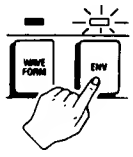
(EXAMPLE 2)

Initializing DCA1

① Press and hold down the INITIALIZE key.

② Simultaneously press the DCA1 ENV key.







Original tones can be created using one of two different methods:
① Selecting a tone close to the object tone from the preset tones, internal tones, or cartridge tones and then modifying accordingly.
② Initializing all parameters and starting from scratch.

The following table shows the initialized values for each parameter:

PARAMETER	INITIALIZED VALUES
VIBRATO	WAVE = 1, DELAY = 00, RATE = 50, DEPTH = 00
OCTAVE	RANGE = +0
WAVE FORM (DCO 1, DCO 2)	FIRST = 1 SECOND = 0
PITCH ENVELOPE (DCO 1, DCO 2)	STEP1 / STEP1 – 7 / STEP8 RATE: 50 / 50 / 50 LEVEL: 00 / 00 / 00 ENV POINT: SUS / • • • / END
DCW KEY FOLLOW	RANGE = 0
WAVE ENVELOPE (DCW 1, DCW 2)	STEP1 / STEP1 – 7 / STEP8 RATE: 99 / 50 / 50 LEVEL: 99 / 00 / 00 ENV POINT: SUS / • • • / END
DCA KEY FOLLOW	RANGE = 0
AMP ENVELOPE (DCA 1, DCA 2)	STEP1 / STEP1 – 2 / STEP8 RATE: 99 / 50 / 50 LEVEL: 99 / 00 / 00 ENV POINT: SUS / • • • / END
LEVEL	LEVEL = 15
VELOCITY	AMP = 00, WAVE = 00, PITCH = 00
DETUNE	(+), OCTAVE = 0, NOTE = 00, FINE = 00

*Data is initialized to values that are the most convenient for the creation of new tones (00, 99 or, midpoint).
*NAME cannot be initialized.

1-18 COMPARE/RECALL

The tone most recently created using the PARAMETER SECTION is temporarily stored in the COMPARE/RECALL area of the PROGRAMMER SECTION. An independent COMPARE/RECALL area capable of holding a single tone exists in the normal mode. The moment data are modified using the PARAMETER SECTION, all parameter data for the resulting tone enter this area where it remains until another tone is created.

The tone stored in the COMPARE/RECALL area is called when the COMPARE/RECALL key in the PROGRAMMER SECTION is ON (indicator above the key is lit).



Indicator lit
(Most recent tone data called).

Changing any parameter data for a tone recalled from the preset, internal or cartridge tones causes the COMPARE/RECALL key to automatically switch ON and the data for the tone to be stored in memory. Switching the COMPARE/RECALL key OFF at this time recalls the data for the original (unmodified) tone. In this way, the original tone can be compared with the modified tone by switching the COMPARE/RECALL key ON and OFF.



Indicator OFF
(Original tone data recalled).

The data stored in the COMPARE/RECALL area is erased when the data for another tone is modified.
Therefore, any tone data in this area that may be required later should be saved to the internal bank in the PROGRAMMER SECTION using the WRITE operation outlined in the next section of this manual.

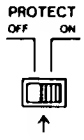
1-19 TONE DATA WRITE/SAVE/LOAD

WRITE is used to store newly created tone data in the internal bank or cartridge area, SAVE is used to collectively store all internal bank tone data to a RAM cartridge, and LOAD is used to reload data to the internal bank from cartridge or tape.

MEMORY PROTECT FUNCTION

The function protects against inadvertently erasing valuable tone data from memory. LOAD from external memory sources and WRITE operations cannot be performed when the PROTECT switch on the back panel of the CZ-1 is ON.

*The PROTECT switch should only be set to the OFF position during WRITE and LOAD operations. Keep the switch in the ON position for normal use and SAVE operations.



Usually left ON.

•WRITE

We "WRITE" altered or newly created tones when we store them to the internal bank or a cartridge. Data altered in the Parameter Section are temporarily stored after alteration in the COMPARE/RECALL area. Notice this is temporary. Data stored in the COMPARE/RECALL area will be erased the instant other data are altered.
Therefore, it is necessary to WRITE important tone data from the COMPARE/RECALL area to memory.

Before beginning WRITE operations, confirm the COMPARE/RECALL key is ON.



① Set the PROTECT switch on the back panel of the unit to the OFF position.

*The following will appear on the LCD when the WRITE key is pressed while the PROTECT switch is left ON.

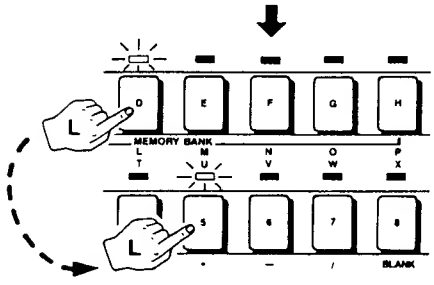
```
PROTECT SWITCH
* ON *
```

② Press the MEMORY BANK (A~H) and MEMORY NO. (1~8) keys to specify the destination memory bank while holding down the WRITE key (write to internal bank). To write to a cartridge, press and hold down the WRITE key, switch the CARTRIDGE key ON, and then press the MEMORY BANK and MEMORY NO. keys.

(Example) WRITE to internal bank D-5



HOLDING DOWN THE WRITE KEY .....



*When the WRITE key is pressed, all indicators in the Programmer Section go out and the following is displayed in the LCD:

```
WRITE
SELECT MEMORY!
```

*Press first MEMORY bank key D and then Memory No. key 5. Indicators will light above the respective keys and the following will appear on the LCD:

```
WRITE
OK!
```

*This display indicates that WRITE operations are complete, so the WRITE key can be released. INTERNAL D-5 will appear on the LCD.

③ Return the PROTECT switch to the ON position.

- When a tone is unaltered after calling it in the Programmer Section, or if WRITE is performed with the COMPARE/RECALL key OFF, the data for the tone is written as it is to the specified memory area. This makes it possible to copy tones from one memory number to another.
- Always confirm proper WRITE operations by pressing a few keyboard keys in the memory area to which data has been written.
- The display will appear as illustrated below while the WRITE key is pressed if an attempt is made to write to a cartridge is not loaded in the keyboard. In this case, load a RAM cartridge and then attempt to write the data again.

```
==NOT READY==
INSERT CARTRIDGE
```

•SAVE/LOAD

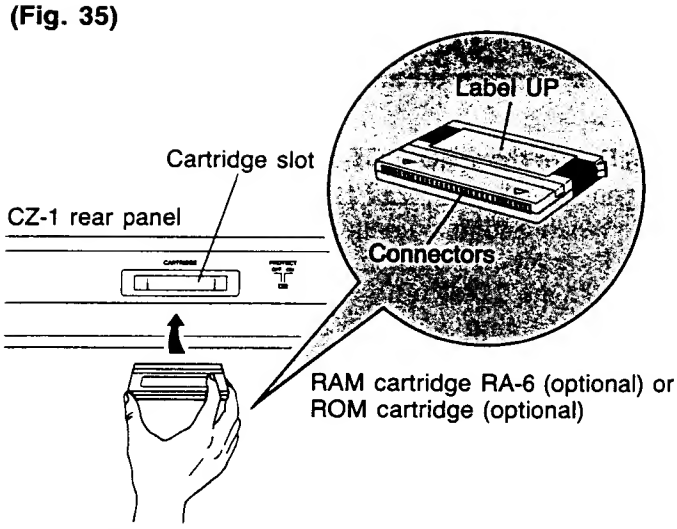
Each WRITE operation to the internal bank requires the deletion of one of the tones already stored. The use of an optional RAM cartridge (RA-6) makes it possible to save the 64 tones for storage until they are needed, thus freeing the internal bank for the storage of additional data. Necessary tone data can later be loaded from a RAM cartridge (or ROM cartridge) into the internal bank of the CZ-1.

SAVE and LOAD operations involve simultaneous transfer of all 64 internal tones and 64 operation memories (see 4-5 OPERATION DATA SAVE/LOAD). Note also that the LOAD operation only is possible with optional ROM cartridges.

(1) CARTRIDGE LOADING

Load a RAM cartridge (optional RA-6) or ROM cartridge (optional) into the cartridge slot on the rear panel of the CZ-1 as shown in Fig. 35. The cartridge should be inserted straight into the slot with the cartridge connectors facing the keyboard.

(Fig. 35)



(2) SAVE

① Correctly load a cartridge into the unit (see Fig. 35).

② Set the PROTECT switch on the rear panel of the unit to OFF.

*The LCD will appear as illustrated below and SAVE operations are impossible (memory protect function) if the PROTECT switch is left in the ON position.

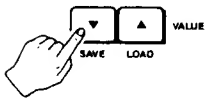
```
PROTECT SWITCH
* ON *
```

③ Press the CARTRIDGE/MIDI key.



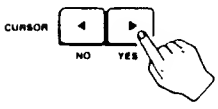

```
CARTRIDGE
SAVE OR LOAD
```

④ Press the SAVE key (VALUE ▼ key) in the DATA ENTRY SECTION.




```
SAVE CARTRIDGE
(Y/N)?
```

⑤ The internal 64 tones are saved when the YES key is the DATA ENTRY section is pressed.




```
SAVE CARTRIDGE
OK!
```

*Save operations are complete when 'OK!" appears on the display.
*Switch the PROTECT switch back to the ON position when SAVE operations are complete.

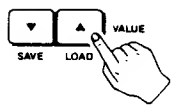
(3) LOAD

① Correctly load a cartridge into the unit (see Fig. 35).

② Set the PROTECT switch on the rear panel of the unit to OFF.
*LOAD operations are impossible if the PROTECT switch is left in the ON position.

③ Press the CARTRIDGE/MIDI key.

④ Press the LOAD key (VALUE ▲ key) in the DATA ENTRY SECTION.




```
LOAD CARTRIDGE
(Y/N)?
```

⑤ The internal 64 tones contained in the cartridge are loaded to the internal bank when the YES key in the DATA ENTRY section is pressed.

```
LOAD CARTRIDGE
OK!
```

*Load operations are complete when "OK!" appears on the display.
*Switch the PROTECT switch back to the ON position when LOAD operations are complete.

NOTE

- The following message will appear on the LCD if SAVE/LOAD operations are attempted when a cartridge is not loaded or if it is improperly loaded.

```
---NOT READY---
INSERT CARTRIDGE
```

If such messages should appear, reinsert the cartridge as far as it will go and reattempt SAVE/LOAD procedures.

- The optional RA-6 RAM cartridges are equipped with a built-in lithium battery that will preserve contents for approximately 1 year (longer if the RAM cartridge is inserted in the CZ-1). If the cartridge is stored outside of the keyboard unit for extended periods, the battery should be periodically replaced to avoid alteration or erasure of data. (See RA-6 OPERATION MANUAL.)

*RAM contents are erased when the battery is replaced. Load the data from the cartridge to the keyboard before changing the battery.

120 EXCHANGE

The EXCHANGE function makes it possible to swap any two of the 128 tones available in the internal bank and on the cartridge.

① Set the PROTECT switch on the rear panel of the unit to OFF.
*EXCHANGE operations are impossible if the PROTECT switch is left in the ON position.

② Specify one of the tones to be swapped using the keys in the PROGRAMMER SECTION.

③ Press the EXCHANGE key.
*All indicators will go out and the display will appear as illustrated below while the EXCHANGE key is pressed.





④ While holding down the EXCHANGE key, specify the other tone to be swapped using the keys in the PROGRAMMER SECTION.
*Exchange operations are complete when "OK!" appears on the display.



*Switch the PROTECT switch back to the ON position when EXCHANGE operations are complete.
*EXCHANGE operations are impossible while the COMPARE/RECALL indicator is lit.

(EXAMPLE) — Exchanging internal D-5 with cartridge E-3.

After specifying MEMORY BANK [D], MEMORY NO. [5], hold down the EXCHANGE key and press CARTRIDGE, MEMORY BANK [E], MEMORY NO. [3].

PART 2

TONE MIX MODE

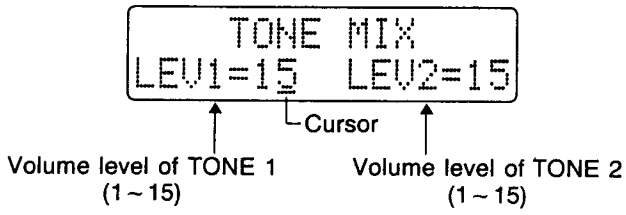
2-1 TONE MIX SETTINGS

With the CZ-1, two of the 128 cartridge and internal tones can be mixed for output. The volumes of the individual tones that make up a tone mix can be independently controlled. At this time, the keyboard becomes 4-note polyphonic.

(1) TONE AND VOLUME LEVEL

① Press the TONE MIX key.





① Tones can be selected and the volume can be set for the position (LEV 1/LEV 2) at which the cursor is located. In the situation shown above, the cursor is below the level for TONE 1, and so the tone and volume level can be changed.

- Select 1 tone from the internal bank or cartridge.
- Use the VALUE keys to set the volume level within a range of 1 through 15. A setting of 15 represents maximum volume.

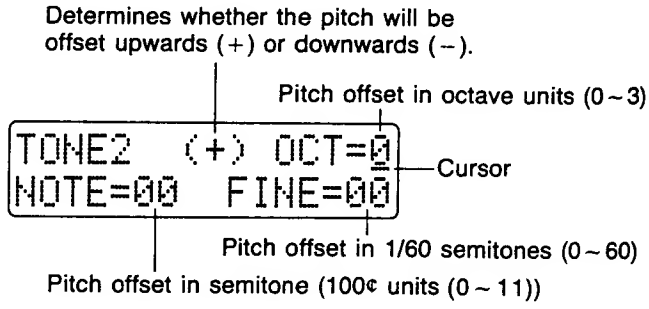
② Use the ▶ CURSOR key in the Data Entry Section to move the cursor under the LEV 2 value. Set the tone and volume level in the same manner as that outlined for LEV 1.

(2) TONE 2 PITCH SETTING

Changing the TONE 2 pitch within the range of ±4 octaves makes it possible to offset the pitches of TONE 1 and TONE 2 to produce sounds that are deeper and mellower. The method used to specify the data in this procedure is identical to that used for PARAMETER SECTION DETUNE.

The display will appear as illustrated in Fig. 1 when the PAGE UP key is pressed while in the TONE MIX mode.

(Fig. 1)



① +/−

Use the CURSOR ◀ key to move the cursor below the "+" (or "−") display. Pressing the VALUE ▼▲ keys changes the display to "+" (for upwards offset) or "−" (for downwards offset).

② OCT

Use the CURSOR ▶ key to move the cursor below the OCT value. Pressing the VALUE ▼▲ keys changes the value in the range of 0~3.

③ NOTE

Use the CURSOR ▶ key to move the cursor below the NOTE value. Pressing the VALUE ▼▲ keys changes the value in the range of 00~11.

④ FINE

Use the CURSOR ▶ key to move the cursor below the FINE value. Pressing the VALUE ▼▲ keys changes the value in the range of 00~60.

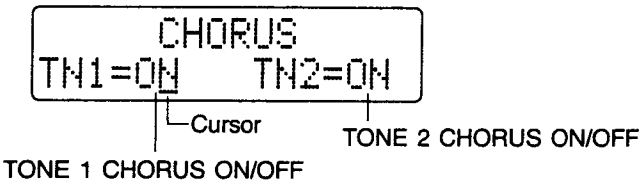
*The data included in ①~④ above makes it possible to set pitch within a range of ±4 octaves. The pitches of TONE 1 and TONE 2 are identical when OCT, NOTE and FINE are all set to 0.

(3) CHORUS ON/OFF

Chorus for each of the two mixed tones can be independently switched ON/OFF.

The display will appear as illustrated in Fig. 2 when the PAGE UP key is pressed twice while in the TONE MIX mode.

(Fig. 2)



① When the cursor is located at TONE 1 as illustrated in Fig. 2, the VALUE ▼▲ keys can be used to switch TONE 1 CHORUS ON and OFF.

② After moving the cursor to TONE 2 using the CURSOR ▶ key, the VALUE ▼▲ keys can be used to switch TONE 2 CHORUS ON and OFF.

*The STEREO CHORUS effect controlled by the CHORUS CONTROL in the OVERALL CONTROL SECTION is applied when CHORUS is ON.

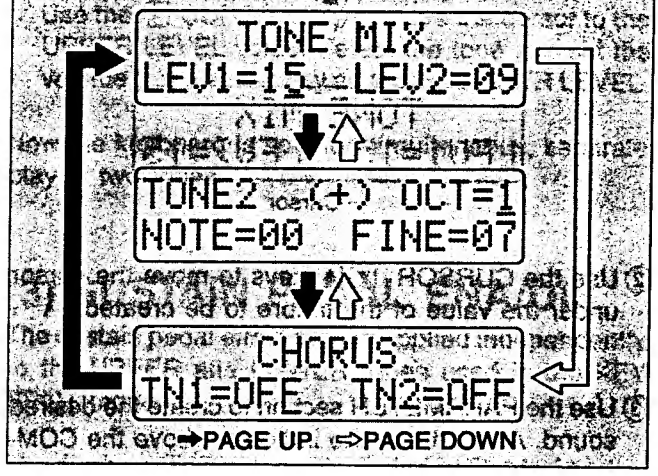
•TONE MIX MODE OUTPUT

One of the LINE OUT outputs noted in the table below is produced according to the CHORUS ON/OFF setting when the CZ-1 is in the TONE MIX mode. TONE 2 is output from terminal A/A+B and TONE 1 is output from terminal B when CHORUS is OFF for both tones.

LINE OUT / CHORUS ON/OFF	A/B+B	B
TONE1=ON, TONE2=ON	TONE1+TONE2	TONE1+TONE2
TONE1=ON, TONE2=OFF	TONE1+TONE2	TONE1
TONE1=OFF, TONE2=ON	TONE2	TONE1+TONE2
TONE1=OFF, TONE2=OFF	TONE2	TONE1

•PAGE UP/DOWN

PAGE UP/DOWN operations in the TONE MIX mode result in one of three illustrated below.



2-2 EFFECT/OVERALL CONTROL

One of the four effects included in the table below can be set in the TONE MIX mode. The EFFECT SECTION data in the TONE MIX mode is common with that of the NORMAL mode, but the PORTAMENTO ON/OFF, GLIDE ON/OFF, and MODULATION ON/OFF key status can be set independently in each mode. Setting of the SOLO ON/OFF key as well as MASTER TUNE and KEY TRANSPOSE settings are also possible with the same procedure as that used in the NORMAL mode.

EFFECT	Parameters (EFFECT SECTION)	CONTROL
PORTAMENTO	SWEEP = 0,1/TIME = 00 ~ 99	ON/OFF
GLIDE	NOTE = – 12 ~ + 12/TIME = 00 ~ 99	ON/OFF
PITCH BEND	RANGE = 0 ~ 12	BEND WHEEL
MOD. WHEEL /AFTER TOUCH	MOD. WHEEL DEPTH = 00 ~ 99	MOD. WHEEL
	MOD. AFTER TOUCH DEPTH = 00 ~ 99	Key after touch
	AMP. AFTER TOUCH RANGE = 00 ~ 15	Key after touch

*The four EFFECTs and SOLO ON/OFF are applied to both TONE 1 and TONE 2.

The latest panel settings made in the TONE MIX mode are retained when another mode is entered or the power of the unit is switched OFF. See PART 4 OPERATION MEMORY for details on saving multiple settings in memory and retaining important tone mix settings.

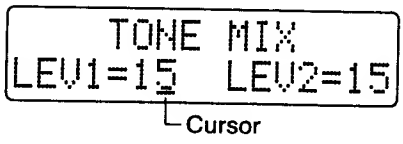
2-3 TONE MIX MODE SOUND CREATION

PARAMETER SECTION data for each of the two tones used in tone mixing can be set to create new sounds. Two separate COMPARE/RECALL areas are retained for TONE 1 and TONE 2, and all tone data settings are performed using the same procedure as that outlined for the NORMAL mode.

(1) SOUND CREATION

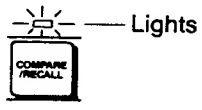
① Switch the TONE MIX key ON to enter the TONE MIX mode.





② Use the CURSOR ▼▲ keys to move the cursor under the value of the timbre to be created.

③ Use the PARAMETER section to create the desired sound. At this time, the indicator above the COMPARE/RECALL key in the PROGRAMMER SECTION will light to indicate that the changed data is stored for the tone under which the cursor is located.



④ The CURSOR ▼▲ keys can be used to move the cursor under the value of the other tone. The above procedures are then repeated and both tones are stored in separate COMPARE/RECALL areas.

(2) TONE DATA WRITE

Tones created in the TONE MIX mode can be stored in the internal bank or cartridge with the same procedures as those used in the NORMAL mode (see p 36). Simply use the CURSOR ▼▲ keys to move the cursor under the desired tone and use the WRITE key to write the data to the internal bank or cartridge.



NOTE

The procedures for TONE DATA SAVE/LOAD and EXCHANGE in the NORMAL mode are identical for the TONE MIX mode.

PART 3

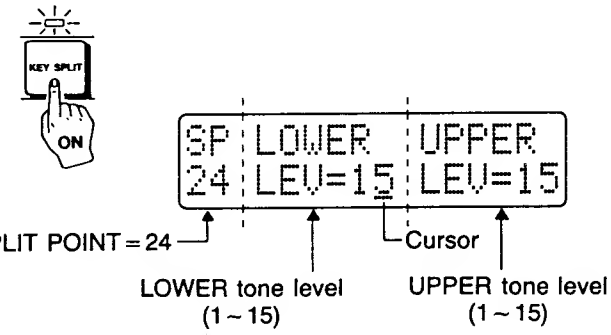
KEY SPLIT MODE

3-1 KEY SPLIT SETTINGS

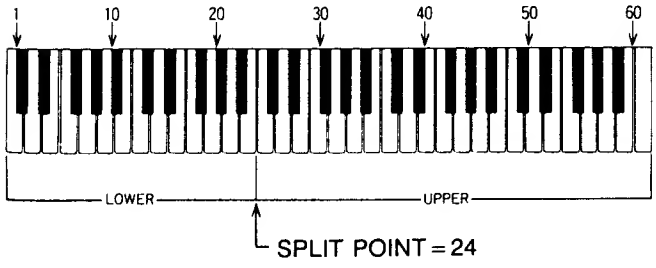
With the CZ-1, two tones can be assigned to the upper and lower ranges of the keyboard. The split point of the keyboard and the individual volumes of the two tones can be freely set, and effects can be set to ON and OFF.

(1) SPLIT POINT SETTING

Press the KEY SPLIT key in the Mode Select Section.



Use the CURSOR keys to move the cursor to the SPLIT POINT value. Use the VALUE keys to set the value within a range of 1 through 60. This determines the split point.



(2) TONE AND VOLUME LEVEL

① Use the ▶ CURSOR key to move the cursor to the LOWER LEVEL value. Here, the LOWER tone and volume level are set.

- Select one of the internal or cartridge tones using the Programmer Section. The tone selected will be playable to the left of the split point.
- The VALUE keys in the Data Entry Section are used to set the volume level within a range of 1 through 15. A setting of 15 represents maximum volume.

② Use the ▶ CURSOR key to move the cursor to the UPPER LEVEL value. Select the tone and set the volume in the same way as for the LOWER LEVEL.

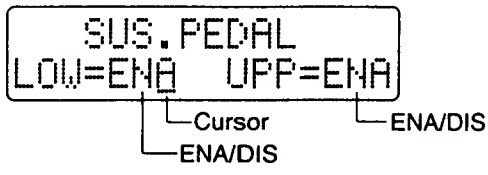
Now the keyboard is split for simultaneous, separate play of two tones.

(3) SUSTAIN PEDAL ENA/DIS

The sustain pedal effect can be applied independently to the UPPER and LOWER tones used in the KEY SPLIT mode.

The display will appear as illustrated in Fig. 1 when the PAGE UP key is pressed while in the KEY SPLIT mode.

(Fig. 1)



"ENA" is the abbreviation of the word "enable" which indicates that the pedal effect is applied, while "DIS" or "disable" means that the effect is not applied.

① When the cursor is located under the LOWER specification as shown in Fig. 1, the VALUE ▼▲ keys can be used to switch between sustain pedal ENA/DIS for the LOWER tone.

② Moving the cursor to the UPPER specification makes it possible to use the VALUE ▼▲ keys to switch between sustain pedal ENA/DIS for the UPPER tone.

*Note that UPPER and LOWER cannot both be set to DIS at the same time.

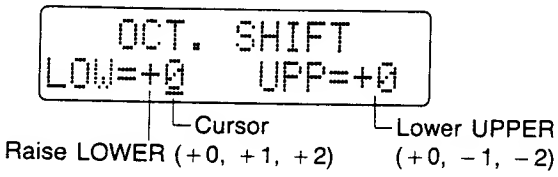
*Setting LOW = DIS/UPPER = ENA causes the upper tone to be held when the sustain pedal is depressed.

(4) OCT. SHIFT

The LOWER and UPPER octaves can each be shifted in octave units.

The display will appear as illustrated in Fig. 2 when the PAGE UP key is pressed twice while in the KEY SPLIT mode.

(Fig. 2)



① When the cursor is located under the LOWER specification as shown in Fig. 2, the VALUE ▲ key can be used to raise the LOWER tone one octave (+1) or two octaves (+2).

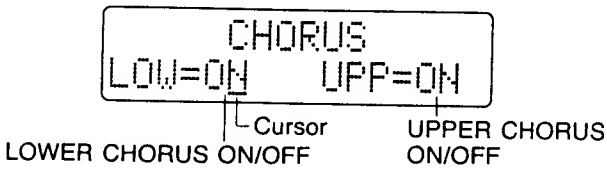
② Moving the cursor to the UPPER specification makes it possible to use the VALUE ▶ key to lower the UPPER tone one octave (−1) or two octaves (−2).

(5) CHORUS ON/OFF

Chorus for each of the two split tones can be independently switched ON/OFF.

The display will appear as illustrated in Fig. 3 when the PAGE UP key is pressed three times while in the KEY SPLIT mode.

(Fig. 3)



① When the cursor is located at LOWER as illustrated in Fig. 3, the VALUE ▼▲ keys can be used to switch the LOWER tone CHORUS ON and OFF.

② After moving the cursor to UPPER using the CURSOR ▶ key, the VALUE ▼▲ keys can be used to switch the UPPER tone CHORUS ON and OFF.

*The STEREO CHORUS effect controlled by the CHORUS CONTROL in the OVERALL CONTROL SECTION is applied when CHORUS is ON.

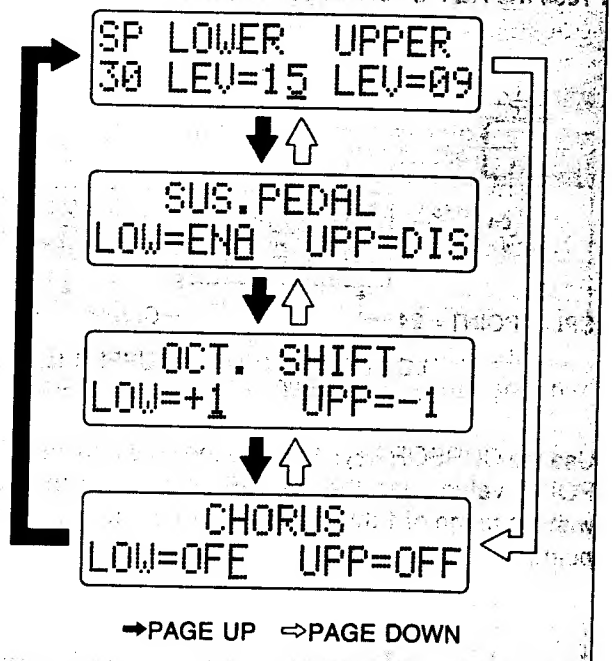
•KEY SPLIT MODE OUTPUT

One of the LINE OUT outputs noted in the table below is produced according to the CHORUS ON/OFF setting when the CZ-1 is in the KEY SPLIT mode. UPPER tone is output from terminal A/A+B and LOWER tone is output from terminal B when CHORUS is OFF for both tones.

CHORUS ON/OFF \ LINE OUT	A/B+B	B
LOWER=ON, UPPER=ON	LOWER+UPPER	LOWER+UPPER
LOWER=ON, UPPER=OFF	LOWER+UPPER	LOWER
LOWER=OFF, UPPER=ON	UPPER	LOWER+UPPER
LOWER=OFF, UPPER=OFF	UPPER	LOWER

•PAGE UP/DOWN

PAGE UP/DOWN operations in the KEY SPLIT mode results in one of four displays illustrated below.



3-2 EFFECT/OVERALL CONTROL

One of the four effects included in the table below can be set in the KEY SPLIT mode. The EFFECT SECTION data in the KEY SPLIT mode is common with that of the NORMAL mode, but the PORTAMENTO ON/OFF, GLIDE ON/OFF, and MODULATION ON/OFF key status can be set independently in each mode. Setting of the SOLO ON/OFF key as well as MASTER TUNE and KEY TRANSPOSE settings are also possible with the same procedure as that used in the NORMAL mode.

EFFECT	Parameters (EFFECT SECTION)	CONTROL
PORTAMENTO	SWEEP = 0,1/TIME = 00 ~ 99	ON/OFF
GLIDE	NOTE = −12 ~ +12/TIME = 00 ~ 99	ON/OFF
PITCH BEND	RANGE = 0 ~ 12	BEND WHEEL
MOD. WHEEL /AFTER TOUCH	MOD. WHEEL DEPTH = 00 ~ 99	MOD. WHEEL
	MOD. AFTER TOUCH DEPTH = 00 ~ 99	Key after touch
	AMP. AFTER TOUCH RANGE = 00 ~ 15	Key after touch

*PORTAMENTO ON/OFF, GLIDE ON/OFF, and SOLO ON/OFF can be set independently for the UPPER and LOWER tones. PITCH BEND and MODULATION are applied commonly to both the UPPER and LOWER tones.

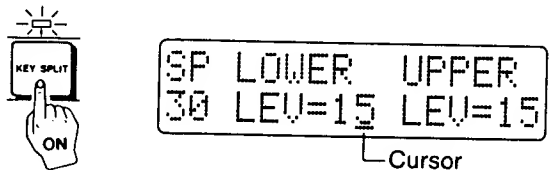
The latest panel settings made in the KEY SPLIT mode are retained when another mode is entered or the power of the unit is switched OFF. (See PART 4 OPERATION MEMORY for details on saving multiple settings in memory and retaining important key split settings.

3-3 KEY SPLIT MODE SOUND CREATION

PARAMETER SECTION data for each of the two tones used for KEY SPLIT can be set to create new sounds. Two separate COMPARE/RECALL areas are retained for the UPPER and LOWER tones, and all tone data settings are performed using the same procedure as that outlined for the NORMAL mode.

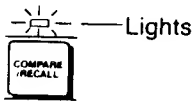
(1) SOUND CREATION

① Switch the KEY SPLIT key ON to enter the KEY SPLIT mode.



② Use the CURSOR ◀ ▶ keys to move the cursor under the value of the tone to be created.

③ Use the PARAMETER section to create the desired sound. At this time, the indicator above the COMPARE/RECALL key in the PROGRAMMER SECTION will light to indicate that the changed data is stored for the tone under which the cursor is located.



④ The CURSOR ◀ ▶ keys can be used to move the cursor under the value of the other tone. The above procedures are then repeated and both tones are stored in separate COMPARE/RECALL areas.

(2) TONE DATA WRITE

Tones created in the KEY SPLIT mode can be stored in the internal bank or cartridge with the same procedures as those used in the NORMAL mode (see p 36). Simply use the CURSOR ◀ ▶ keys to move the cursor under the desired tone and use the WRITE key to write the data to the internal bank or cartridge.



NOTE

The procedures for TONE DATA SAVE/LOAD and EXCHANGE in the NORMAL mode are identical for the KEY SPLIT mode.

PART 4

OPERATION MEMORY MODE

4-1 OPERATION MEMORY OVERVIEW

Besides the internal bank used for storage of 64 tone data, the memory of the CZ-1 also includes an operation memory to store up to 64 sets of panel settings. This means that such panel settings of the CZ-1 as including such parameters as mode, tone, and effect data, as well as ON/OFF settings can be instantly switched to any stored combination when required.

•OPERATION DATA TABLE

The following table shows the type of panel settings that can be stored for one set of operation data in one mode.

○ ◎ : Independent setting possible for each of the 64 operations.

◎ : Independent setting possible for each tone of TONE MIX mode (TONE1/TONE2) and KEY SPLIT mode (UPPER/LOWER).

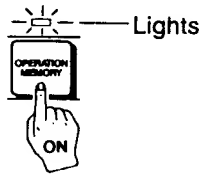
Operation data \ Mode	NORMAL	TONE MIX	KEY SPLIT
TONE NO. (internal or cartridge A-1 ~ H-8)	○	◎	◎
VOLUME LEVEL		◎	◎
TONE2 PITCH		○	
SPLIT POINT			○
SUS. PEDAL EN/DIS			◎
OCT. SHIFT			◎
CHORUS ON/OFF	○	◎	◎
PORTAMENTO DATA (SWEEP TIME)	○	○	○
PORTAMENTO ON/OFF	○	○	◎

Operation data \ Mode	NORMAL	TONE MIX	KEY SPLIT
GLIDE DATA (NOTE TIME)	○	○	○
GLIDE ON/OFF	○	○	◎
BEND RANGE	○	○	○
MOD. WHEEL DEPTH	○	○	○
MOD. AFTER TOUCH DEPTH	○	○	○
AMP. AFTER TOUCH RANGE	○	○	○
MODULATION ON/OFF	○	○	○
SOLO ON/OFF	○	○	◎

4-2 OPERATION RECALL

(1) OPERATION MEMORY MODE

Switch ON the OPERATION MEMORY key in the MODE SELECT SECTION.

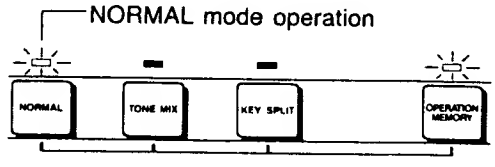


•The operation memory currently set will be displayed.

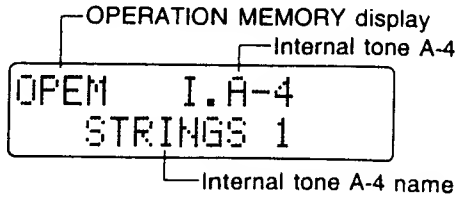
<NORMAL MODE OPERATION>

The called operation is specified for the NORMAL mode when the indicators above, both the NORMAL key and OPERATION MEMORY key in the MODE SELECT SECTION, are lit as illustrated in Fig. 1. At this time, the LCD will show a tone number (internal or cartridge) and tone name (see Fig. 2).

(Fig. 1)



(Fig. 2)

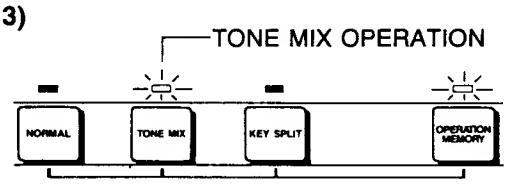


<TONE MIX MODE OPERATION>

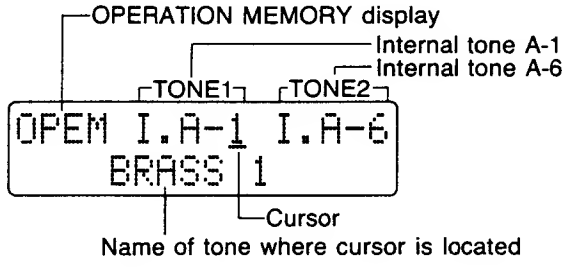
The called operation is specified for the TONE MIX mode when the indicators above, both the TONE MIX key and OPERATION MEMORY key in the MODE SELECT SECTION, are lit as illustrated in Fig. 3. At this time, the LCD will show the two tones used in the tone mix. The example in Fig. 4 shows internal A-1 (TONE1) and internal A-6 (TONE2), with the tone name displayed (BRASS 1) being that for the current cursor location (TONE1).

*Each press of the CURSOR ◀ ▶ keys in the DATA ENTRY SECTION switches between the two tones and also switches the name at the bottom of the LCD.

(Fig. 3)



(Fig. 4)

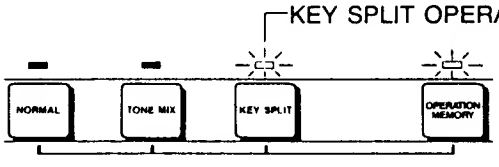


<KEY SPLIT MODE OPERATION>

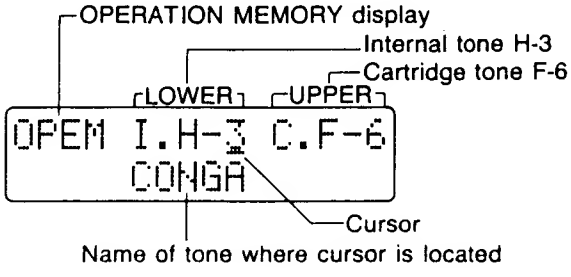
The called operation is specified for the KEY SPLIT mode when the indicators above, both the KEY SPLIT key and OPERATION MEMORY key in the MODE SELECT SECTION, are lit as illustrated in Fig. 5. At this time, the LCD will show the two tones used in the key split. The example in Fig. 6 shows internal H-3 (LOWER) and cartridge F-6 (UPPER), with the tone name displayed (CONGA) being that for the current cursor location (LOWER).

*Each press of the CURSOR ◀ ▶ keys in the DATA ENTRY SECTION switches between the two tones and also switches the name at the bottom of the LCD.

(Fig. 5)

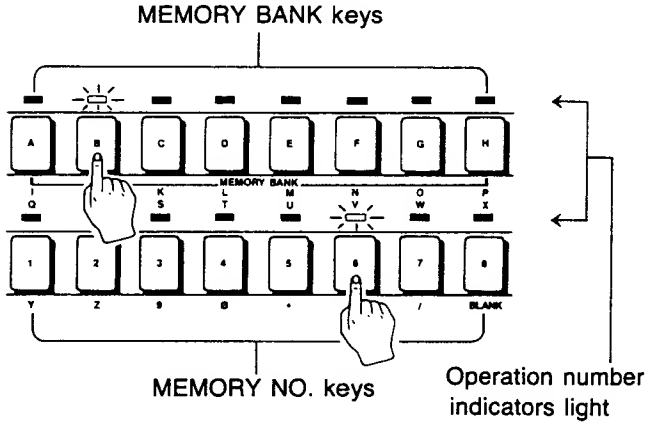


(Fig. 6)



(2) OPERATION MEMORY CALL

64 operations are preset in the OPERATION MEMORY. Selection is performed using the MEMORY BANK (A~H) and MEMORY NO. (1~8) keys in the PROGRAMMER SECTION.

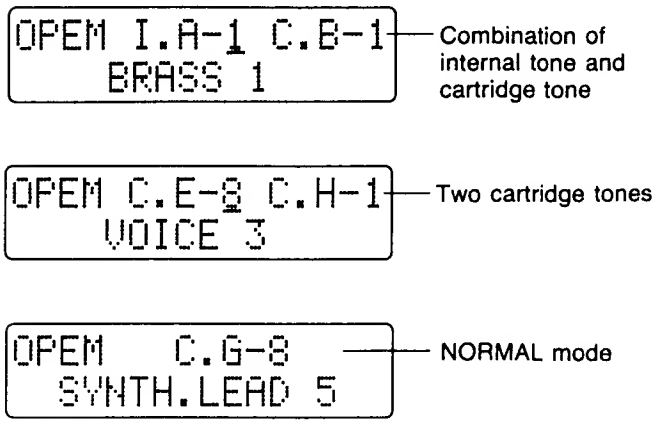


- The contents of the selected operation are shown on the LCD (see preceding Figs.1~6).
- The OPERATION MEMORY mode is entered when power is switched on if it was selected when power was switched OFF, and the last operation selected is called.
- The indicators in the PROGRAMMER SECTION show the operation number in the OPERATION MEMORY mode, and tone numbers are shown on the LCD.

64 operations are preset at the factory for use with the preset internal tones.

(3) CARTRIDGE OPERATIONS

Besides the operations used by the internal tones, operations used by cartridge tones can also be stored in the operation memory.



NOTE

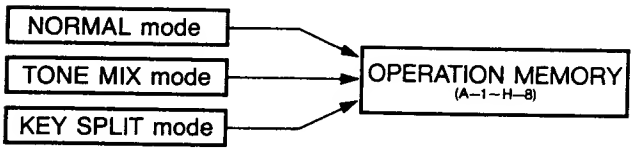
The display will appear as illustrated on the right if an attempt is made to specify an operation number used by a cartridge tone when a cartridge is not loaded in the keyboard.

```
---NOT READY----
INSERT CARTRIDGE
```

In this case, load a RAM cartridge and then attempt to specify the operation number again.

4-3 OPERATION DATA WRITE

Data set in the NORMAL, TONE MIX, and KEY SPLIT modes (see OPERATION DATA TABLE, p 46) can be written to the operation memory.



① Set the operation data for the selected mode.

② Set the PROTECT switch on the rear panel of the unit to OFF.

*WRITE operations are impossible if the PROTECT switch is left in the ON position.

```
PROTECT SWITCH
* ON *
```

③ Press the MEMORY BANK (A~H) and MEMORY NO. (1~8) keys to specify the destination memory bank while holding down the WRITE key.

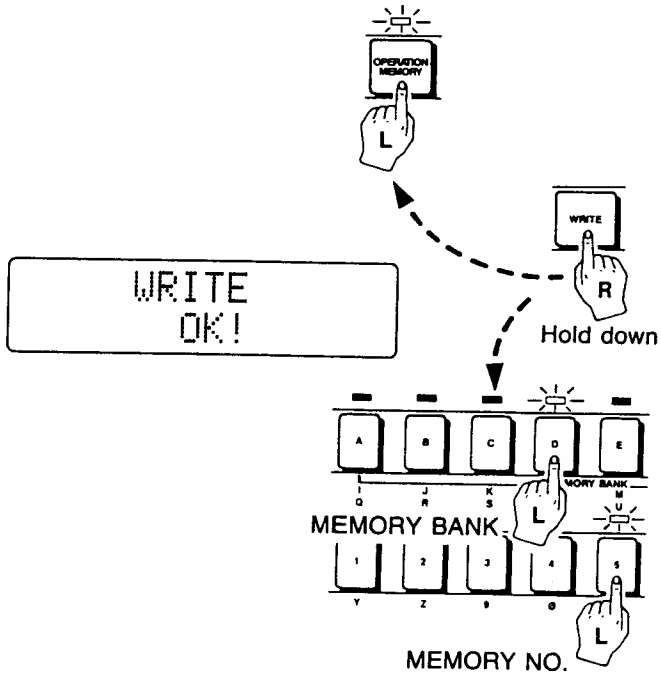
(EXAMPLE)

Writing to operation D-5

*The LCD appears as illustrated below when the OPERATION MEMORY key is pressed while the WRITE key is held down.

```
WRITE(OPEM)
SELECT MEMORY!
```

*Pressing MEMORY BANK [D] followed by MEMORY NO. [5] causes the indicators above both keys to light and the LCD to appear as illustrated below.



*Release the WRITE key when "OK!" appears on the display to indicate that write operations are complete. At this time, the unit will be in the OPERATION MEMORY mode and the display will show operation D-5.

*Switch the PROTECT switch back to the ON position when WRITE operations are complete.

NOTE

During WRITE operations in the OPERATION MEMORY mode, the currently called operation can be copied as it is to another operation number.

4-4 OPERATION DATA MODIFICATION

Operation data can be modified even if it already has been stored in memory. One procedure is used when direct modification in the OPERATION MEMORY mode, and another is used for other modification.

•PROCEDURE 1

The following can be directly set and modified in the OPERATION MEMORY mode.

PORTAMENTO DATA
PORTAMENTO ON/OFF*
GLIDE DATA
GLIDE ON/OFF*
BEND RANGE
MOD. WHEEL DEPTH
MOD. AFTER TOUCH DEPTH
AMP. AFTER TOUCH RANGE
MODULATION ON/OFF
SOLO ON/OFF*

*The ON/OFF key and DATA ENTRY SECTION settings of these data can be modified directly in the OPERATION MEMORY mode. The modifications are only valid for the called operation only and can be performed at any time.

*The above listed data are applied commonly to TONE1 and TONE2 for operations when TONE MIX contents are stored in memory.

*The above listed data are applied independently to UPPER and LOWER tones for operations when KEY SPLIT contents are stored in memory. Data other than that listed is applied commonly to both tones.

*Setting and modification of data applied independently to the two tones of KEY SPLIT is performed moving the cursor on the display.

•PROCEDURE 2

The following cannot be directly set or modified in the OPERATION MEMORY mode.

NORMAL mode	TONE NO. CHORUS NO/OFF
TONE MIX mode	TONE NO. (TONE1, TONE2) VOLUME LEVEL (TONE1, TONE2) TONE2 PITCH CHORUS ON/OFF
KEY SPLIT mode	TONE NO. (LOWER, UPPER) VOLUME LEVEL (LOWER, UPPER) SPLIT POINT SUS. PEDAL ENA/DIS (LOWER, UPPER) OCT. SHIFT (LOWER, UPPER) CHORUS ON/OFF (LOWER, UPPER)

The following procedure can be used to modify the data listed above.

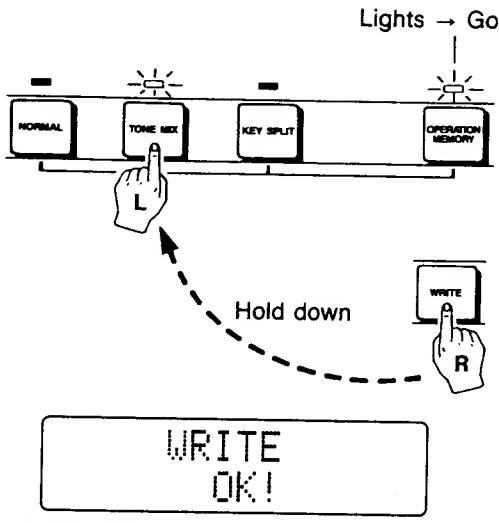
① Call the operation of the data to be modified in the OPERATION MEMORY mode.

② Set the PROTECT switch on the rear panel of the unit to OFF.

③ Press the MODE key which is the same as that for the called operation while pressing the WRITE key.

(EXAMPLE)

TONE MIX mode operation



*The contents of the operation data are written to the selected mode when "OK!" appears on the LCD, the OPERATION MEMORY mode is canceled, and the specified mode is entered.

In the above example, the unit changes from the OPERATION MEMORY mode to the TONE MIX mode.

④ Perform data setting and/or modification.

⑤ Write the new data in the same number of the operation memory.

⑥ Switch the PROTECT switch back to the ON position when WRITE operations are complete.

4-5 OPERATION DATA SAVE/LOAD

The 64 internal tones and 64 sets of operation data can be saved on optional RAM cartridges (RA-6) and then loaded back into the keyboard memory when required.

SAVE/LOAD operations are detailed on page 38. Note that it is impossible to save tone data only or operation data only. Also, tone data can be written one at a time to a cartridge, but all 64 operation data are save to the cartridge at once. Note also that the LOAD operation only is possible with optional ROM cartridges.

4-6 EXCHANGE

The EXCHANGE function makes it possible to swap any two of the 128 tones available in the internal bank and on the cartridge. In the OPERATION MEMORY mode, however, the same operation is used to swap any two of the 64 operation data in the keyboard memory.

① Switch ON the OPERATION MEMORY key to enter the OPERATION MEMORY mode.



② Set the PROTECT switch on the rear panel of the unit to OFF.

*EXCHANGE operations are impossible if the PROTECT switch is left in the ON position.

③ Specify one of the operations to be swapped using the keys in the PROGRAMMER SECTION.

④ Press the EXCHANGE key.

*All indicators will go out and the display will appear as illustrated below while the EXCHANGE key is pressed.





⑤ While holding down the EXCHANGE key, specify the other operation to be swapped using the keys in the PROGRAMMER SECTION.

*Exchange operations are complete when "OK!" appears on the display.



*Switch the PROTECT switch back to the ON position when EXCHANGE operations are complete.

(EXAMPLE) — Exchanging operation D-5 with operation E-3.

After specifying MEMORY BANK [D], MEMORY NO. [5], hold down the EXCHANGE key and press CARTRIDGE, MEMORY BANK [E], MEMORY NO. [3].

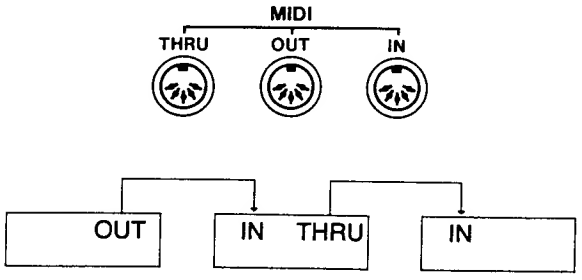
PART 5

MIDI

5-1 COMMUNICATION DATA

MIDI (MUSICAL INSTRUMENT DIGITAL INTERFACE) is a standard interface that allows the connection of two electronic musical instruments. Data can be sent and received between the CZ-1 and another MIDI device through connection with a MIDI cable.

<CZ-1 MIDI TERMINALS>



MIDI IN ..... Receives MIDI data from external device.

MIDI OUT ..... Transmits MIDI data to external device.

MIDI THRU ..... Transmits without modification data received via MIDI IN to external device.

(1) STANDARD COMMUNICATION DATA

The CZ-1 is capable of sending and receiving data which allows remote play, ensemble play and automatic play through connection of another MIDI instrument, personal computer, or sequencer.

○ : Indicates communication possible.

MODE / MESSAGE	NORMAL		TONE MIX		KEY SPLIT		OPERATION MEMORY	
	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE
KEY INTERVAL, ON/OFF, VELOCITY DATA	○	○	○	○	○	○	○	○
AFTER TOUCH DATA	○	○	○	○	○	○	○	○
MODULATION WHEEL DATA	○	○	○	○	○	○	○	○
PORTAMENTO TIME		○		○		○		○
PORTAMENTO ON/OFF	○	○	○	○	○	○	○	○
SUSTAIN PEDAL ON/OFF	○	○	○	○	○	○	○	○
TONE NUMBER DATA (PROGRAM CHANGE)	○	○	○	○	○	○	○	○
PITCH BEND DATA	○	○	○	○	○	○	○	○
LOCAL CONTROL OFF		○		○		○		○
MASTER VOLUME DATA		○		○		○		○
MONO MODE		○		○		○		○
POLY MODE		○		○		○		○
END OF SYSTEM EXCLUSIVE	○	○	○	○	○	○	○	○

*AFTER TOUCH data is not communicated in the MULTI CHANNEL mode outlined after.

(2) SYSTEM EXCLUSIVE

These messages allow tone and operation data communication between two CZ-1 units, and receipt of various types of data from a personal computer. Unlike the messages in the preceding table, these are not limited to messages that can be communicated by all MIDI standard electronic musical instruments.

○ : Indicates communication possible.

MODE / MESSAGE	NORMAL		TONE MIX		KEY SPLIT		OPERATION MEMORY	
	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE
(1) SEND REQUEST 1	○	○	○	○	○	○	○	○
(2) RECEIVE REQUEST 1	○	○	○	○	○	○	○	○
(3) SEND REQUEST 2	○	○	○	○	○	○	○	○
(4) RECEIVE REQUEST 2	○	○	○	○	○	○	○	○
(5) SEND REQUEST 3	○	○	○	○	○	○	○	○
(6) RECEIVE REQUEST 3	○	○	○	○	○	○	○	○
(7) BEND RANGE		○		○		○		○
(8) KEY-TRANSPOSE		○		○		○		○
(9) GLIDE NOTE		○		○		○		○
(10) GLIDE TIME		○		○		○		○
(11) MOD WHEEL DEPTH		○		○		○		○
(12) LEVEL		○		○		○		○
(13) GLIDE ON/OFF	○	○	○	○	○	○	○	○
(14) PORTAMENTO SWEEP		○		○		○		○
(15) MODULATION ON/OFF	○	○	○	○	○	○	○	○
(16) MOD AFTER TOUCH DEPTH		○		○		○		○
(17) AMP AFTER TOUCH RANGE		○		○		○		○
(18) CARTRIDGE ON/OFF	○	○	○	○	○	○		
(19) CZ-1 MODE		○		○		○		○
(20) CURSOR		○		○		○		○
(21) PAGE		○		○		○		
(22) MULTI CHANNEL MODE ON/OFF		○		○		○		○
(23) POLY VALUE		○						
(24) TONE 2 PITCH		○		○		○		
(25) SPLIT POINT		○		○		○		
(26) SUS. PEDAL ENA/DIS		○		○		○		
(27) OCT. SHIFT		○		○		○		
(28) CHORUS ON/OFF		○		○		○		
(29) TIME BREAK		○		○		○		○
(30) KEY CODE SWEEP		○		○		○		○

(1) SEND REQUEST 1

CZ-1 sends the tone data (for one tone) corresponding to the specified number when this message is received. This message is also sent from the CZ-1 to receive tone data from a CZ-5000, CZ-3000, etc.

(2) RECEIVE REQUEST 1

CZ-1 assigns the following tone data (for one tone) to the memory corresponding to the specified number when this message is received. This message is also sent from the CZ-1 when tone data are sent to a CZ-5000, CZ-3000, etc. through operation of the CZ-1.

(3) SEND REQUEST 2

CZ-1 sends the tone data (for one tone) corresponding to the specified number when this message is received. This message is also sent from a master CZ-1 when tone data are received from a slave CZ-1 through operation of the master CZ-1.

(4) RECEIVE REQUEST 2

CZ-1 assigns the following tone data (for one tone) to the memory corresponding to the specified number when this message is received. This message is also sent from a master CZ-1 when tone data are sent to slave CZ-1 through operation of the master CZ-1.

(5) SEND REQUEST 3

CZ-1 sends the operation data (for one operation) corresponding to the specified number when this message is received. This message is also sent from a master CZ-1 when operation data are received from a slave CZ-1 through operation of the master CZ-1.

(6) RECEIVE REQUEST 3
CZ-1 assigns the following operation data (for one operation) to the memory corresponding to the specified number when this message is received. This message is also sent from a master CZ-1 when operation data are sent to slave CZ-1 through operation of the master CZ-1.

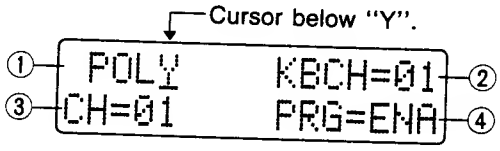
(1)~(6), (16), (17), (18), (21)
These data cannot be communicated in the MULT CHANNEL mode.

(23) POLY
These data can only be received in the MULTI CHANNEL mode.

5-2 COMMUNICATION SETTINGS

The MIDI system of the CZ-1 is composed of a POLY mode and a MULTI CHANNEL mode.

(1) POLY MODE
The LCD appears as illustrated below when the MIDI key is pressed in the NORMAL mode.



①POLY
Indicates POLY mode communication.

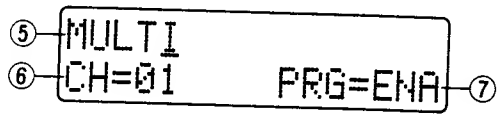
②KBCH = 01 (send channel)
Indicates data sent on channel 1. This value can be changed using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys.

③CH = 01 (receive channel)
Indicates data received on channel 1. This value can be changed using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys.

④PRG = ENA (tone data communication enable/disable)
Indicates that tone number data and volume level can be communicated. This specification can be changed to PRG = DIS (tone number data/volume data cannot be communicated) using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys.

(2) MULTI CHANNEL MODE

•MULTI CHANNEL MODE SETTING
Pressing the VALUE ▼▲ keys while the cursor is at POLY causes the following display to be shown and sets the MULTI CHANNEL mode. At this time the indicator above the MIDI key will go out.



In the MULTI CHANNEL mode, any number of channels from among the 16 (01 ~ 16) available can be selected for receipt of individual tones of the polyphonic value (the total must be 8-note polyphonic or less).

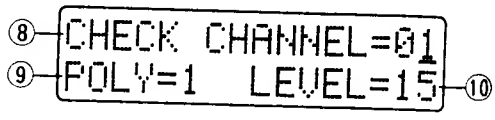
⑤MULTI
Indicates reception in the MULTI CHANNEL mode.

⑥CH = 01 (basic channel)
Indicates that channel 1 is the basic channel. This value can be changed using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys. In the MULTI CHANNEL MODE, each of the multiple channels used are tone channels, and the one representative channel among these is called the basic channel.

⑦PRG = ENA (tone data communication enable/disable)
Indicates that tone number data and volume level can be communicated.

•TONE CHANNEL SETTING
(Setting of polyphonic value and volume for each channel)

Pressing the PAGE UP (or PAGE DOWN) key while the cursor is at MULTI causes the following display to be shown.



⑧CHECK CHANNEL = 01

Indicates among the multiple channels (tone channel) used in the MULTI CHANNEL mode, (1) tone, (2) polyphonic value, (3) volume level, and (4) PORTAMENTO ON/OFF, GLIDE ON/OFF, SOLO ON/OFF can be set independently for channel 01 (i.e. checks each channel). Any channel can be changed using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys.
The settings of (1) tone and (4) PORTAMENTO ON/OFF, GLIDE ON/OFF, SOLO ON/OFF are changed by using the keys on the keyboard panel.

⑨POLY = 1

Sets the polyphonic value (in this case channel 1) for each channel. This value can be changed using the VALUE ▼▲ keys after moving the cursor into position using the CURSOR ◀▶ keys. The total polyphonic value for each channel must be eight or less.

⑩LEVEL = 15 (volume level)

Sets the volume level for each channel (in this case channel 1) within a range of 01 (minimum) to 15 (maximum).

NOTE:

- Cartridge tone numbers cannot be specified in the MULTI CHANNEL mode.
- SOLO automatically switches ON and the indicator above the SOLO key lights when a polyphonic value of 1 (POLY = 1) is specified.

•BASIC CHANNEL AND TONE CHANNEL

A maximum of eight tone channels can be set in the MULTI CHANNEL mode (when each channel is POLY = 1). The channels need not be sequential, and any of the available channels from 01 through 16 can be used. For example, four tone channels can be set as: CH = 01, CH = 03, CH = 05, CH = 07.

One of these tone channels is selected as a basic channel. As noted in the tables below, certain messages can be received via the basic channel only. The data controlled by these messages cannot be applied to individual channels. Rather, these messages are received via the basic channel and are applied to all channels simultaneously.

*MESSAGES RECEIVED BY BASIC CHANNEL (set by ⑥)	*MESSAGES RECEIVED BY EACH TONE CHANNEL (set by ⑦⑧)
*MODULATION WHEEL	*NOTE ON/OFF
PORTAMENTO TIME	*PORTAMENTO ON/OFF
*PITCH WHEEL CHANGE	*SUSTAIN PEDAL ON/OFF
LOCAL OFF	*PORTAMENTO CHANGE
MAIN VOLUME	MONO MODE/POLY MODE

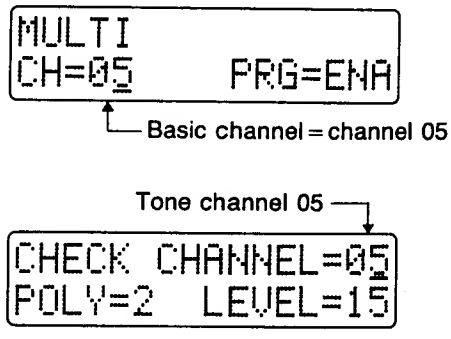
*Also able to receive messages (SEND in the MULTI CHANNEL MODE (MIDI OUT) is performed by the currently specified tone channels.)

SYSTEM EXCLUSIVE	
MESSAGES RECEIVED BY BASIC CHANNEL (set by ⑥)	MESSAGES RECEIVED BY EACH TONE CHANNEL (set by ⑦⑧)
BEND RANGE	LEVEL
KEY TRANSPOSE	*GLIDE ON/OFF
GLIDE NOTE	POLY VALUE 1
GLIDE TIME	KEY CODE SWEEP
MOD. WHEEL DEPTH	
PORTAMENTO SWEEP	
MODULATION ON/OFF	
CZ-1 MODE	
MULTI CHANNEL MODE ON/OFF	
TONE2 PITCH	
SPLIT POINT	
SUS. PEDAL ENA/DIS	
OCT. SHIFT	
CHORUS ON/OFF	
POLY VALUE 2	

*Also able to receive messages.

In the MULTI CHANNEL mode, PITCH BENDER and MODULATION WHEEL are only valid for the tone channel which is the basic channel.

(EXAMPLE)



When 05 is set as the basic channel, PITCH BENDER and MODULATION WHEEL data is communicated on tone channel 05.

NOTE:
After touch is invalid in the MULTI CHANNEL mode.

POLY MODE communication only is possible in the TONE MIX, KEY SPLIT and OPERATION MEMORY modes, while MULTI CHANNEL mode communication is impossible. In these modes, setting of the send channel ②, receive channel ③, and tone data communication enable/disable ④ is identical to the POLY mode settings in the NORMAL mode.

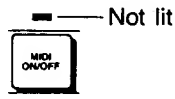
NOTE:

- When program change (tone data change) data, or volume level data are received from an external source in the TONE MIX or KEY SPLIT mode, the tone and volume level are changed on the LCD at the current cursor location.
- When PORTAMENTO ON/OFF, GLIDE ON/OFF, SOLO ON/OFF data is received in the KEY SPLIT mode, the tone and volume level are changed on the LCD at the current cursor location.

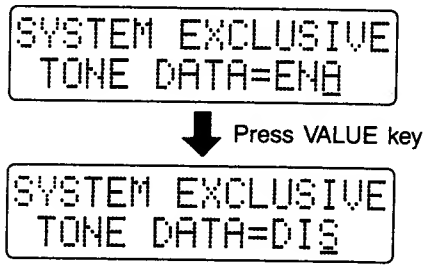
•MIDI MESSAGE COMMUNICATION LIMITATIONS

MIDI message, tone data, and operation memory data communication enable/disable can be controlled manually using the switches on the CZ-1.

(1) Send and receive of all MIDI messages can be disabled by switching the MIDI ON/OFF switch OFF (indicator goes out).



(2) The display illustrated below appears on the LCD when the PAGE UP (or PAGE DOWN) key is pressed after the MIDI switch.



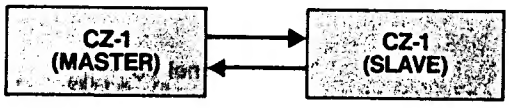
TONE DATA = ENA.....Tone data, operation memory data communication possible.

TONE DATA = DIS.....No communication of data.

5-3 TONE, OPERATION DATA COMMUNICATION

As illustrated below, CZ series synthesizers can interchange tone data and operation memory data.

(1) CZ-1 ↔ CZ-1



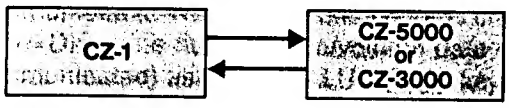
- •1 tone data send
- •1 operation memory data send
- •PARAMETER change data send

Ⓐ

- •64 internal tone data communication
- •64 operation memory data communication

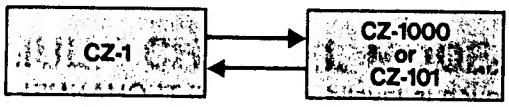
Ⓑ

(2) CZ-1 ↔ CZ-5000



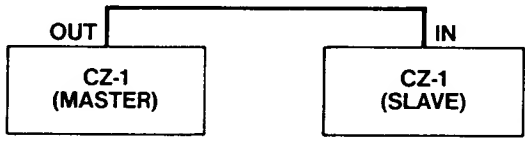
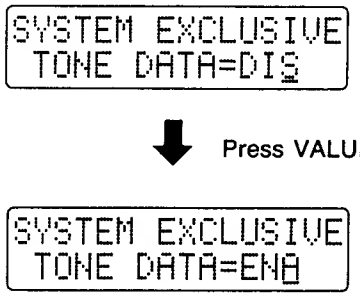
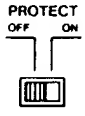
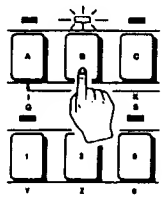
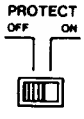
- •32 tone (E1 ~ H8) data of CZ-1 saved to memory bank of CZ-5000
- •64 tone (32 preset + 32 memory) data of CZ-5000 loaded to CZ-1 internal bank (A1 ~ H8)

(3) CZ-1 ↔ CZ-1000/CZ-101



- •16 tone (G1 ~ H8) data of CZ-1 saved to internal bank of CZ-1000/CZ-101
- •32 tone (16 preset + 16 internal) data of CZ-1000/CZ-101 loaded to CZ-1 internal bank (A1 ~ H8)

(1)Ⓐ CZ-1↔CZ-1

	ⓐ 1 tone data send	ⓑ 1 operation memory data send	ⓒ PARAMETER change data send
1	Master unit MIDI OUT terminal connected to SLAVE CZ-1 MIDI IN terminal. 		
2	Both units set to NORMAL, TONE MIX, or KEY SPLIT MODE.	Both units set to OPERATION MEMORY mode.	Both units set to NORMAL, TONE MIX, or KEY SPLIT MODE.
3	① Match master unit send channel (KBCH) and slave unit receive channel (CH). MASTER  SLAVE  **NOTE:** Changed to POLY mode by VALUE key in MULTI CHANNEL mode. ② PRG = ENA for both units.		
4	Press the PAGE UP (or PAGE DOWN) for both units, and use the VALUE ▼▲ keys to set TONE DATA = ENA. 		
5	Confirm that the MIDI ON/OFF indicators of both units are ON. 		
6	Set the PROTECT switch of the slave unit to OFF. 	Press the operation memory bank key (A ~ H) on the master unit that corresponds to the memory area which holds the data to be sent. **(EXAMPLE)** For B-3, press [B]. 	Set the PROTECT switch of the slave unit to OFF. 

Specify the number of the tone to be sent (A1 ~ H8) on the master unit. The indicator above the COMPARE/RECALL key on the slave unit lights to indicate that the tone data has been transferred to the COMPARE/RECALL area.



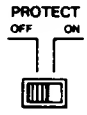
(SLAVE)

NOTE:

- To transmit one tone from a cartridge loaded in the master unit, press the CARTRIDGE key on the master unit followed by the tone number specification (A1 ~ H8).
- When the slave unit is in the TONE MIX or KEY SPLIT mode, the data for the tone where the cursor is located on the display of the slave is transmitted to the COMPARE/RECALL area.

— END —

Set the PROTECT switch of the slave unit to OFF.



Modify parameters on the master unit. The indicator above the COMPARE/RECALL key on the slave unit lights to indicate that the parameter data has been transferred to the COMPARE/RECALL area.



(SLAVE)

NOTE:

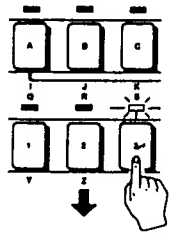
When the slave unit is in the TONE MIX or KEY SPLIT mode, the data for the tone where the cursor is located on the display of the slave is transmitted to the COMPARE/RECALL area.

— END —

Specify the number of the operation memory (1 ~ 8) to be sent on the master unit. The data is sent directly to the specified operation memory bank (A1 ~ H8) of the slave unit.

(EXAMPLE)

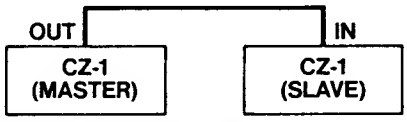
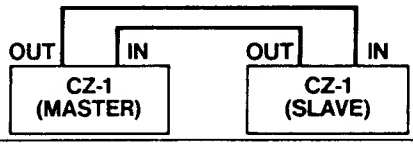
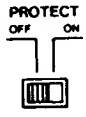
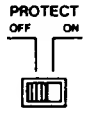
Continuing from procedure 6, press [3] on the master unit.



Data is sent to B-3 of the slave and the indicator lights.

— END —

(1) Ⓑ CZ-1 ↔ CZ-1

MASTER → SAVE → SLAVE	MASTER ← LOAD ← SLAVE
1 Connect the MIDI OUT of the master unit to the MIDI IN of the slave unit. 	Connect the MIDI OUT of the master unit to the MIDI IN of the slave unit, and the MIDI IN of the master unit to the MIDI OUT of the slave unit. 
2 ① Match the send channel (KBCH) of the master unit with the receive channel (CH) of the slave unit. MASTER: POLY KBCH=01 / CH=01 PRG=ENA SLAVE: POLY KBCH=01 / CH=01 PRG=ENA **NOTE:** Changed to POLY mode by VALUE key in MULTI CHANNEL mode. ② PRG = ENA for both units.	
3 Press the PAGE UP (or PAGE DOWN) for both units, and use the VALUE ▼▲ keys to set TONE DATA = ENA. SYSTEM EXCLUSIVE / TONE DATA=DIS ↓ Press VALUE key. SYSTEM EXCLUSIVE / TONE DATA=ENA	
4 Confirm that the MIDI ON/OFF indicators of both units are ON. 	
5 Set the PROTECT switch of the slave unit to OFF. 	Set the PROTECT switch of the master unit to OFF. 
6 The display illustrated appears when the CARTRIDGE/MIDI key is pressed followed by the PAGE UP (or PAGE DOWN) key. MIDI SAVE OR LOAD	
7 The following display is produced when the SAVE key (VALUE ▼ key) is pressed. SAVE MIDI DATA (Y/N)?	The following display is produced when the LOAD key (VALUE ▲ key) is pressed. LOAD MIDI DATA (Y/N)?

The following display is produced when the YES key (CURSOR ▶ key) is pressed, and transmission of 64 internal tone data and 64 operation memory data to the slave unit begins.

```
SAVE MIDI DATA
RUN!
```

During transmission, the slave unit tone indicators light in sequence from A1 through H8. Transmission is complete in approximately 32 seconds, and the next display is produced.
*Transmission becomes approximately 15 seconds if two MIDI cords are used.

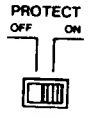
```
SAVE MIDI DATA
OK!
```

(This display produced on slave unit regardless of whether transmission was successful or not.)

NOTE:
Once SAVE is complete:

① Use the VALUE ▼▲ keys to change the display in step 3 to TONE DATA = DIS for both units.

② Set the PROTECT switch of the slave unit to ON.



NOTE:
If the following display is produced when the YES key (CURSOR ▶ key) is pressed, the master unit:

① Is set to TONE = DIS.

② MIDI ON/OFF key is set to OFF (indicator not lit).

```
MIDI
DISABLE
```

The following display is produced when the YES key (CURSOR ▶ key) is pressed, and transmission of 64 internal tone data and 64 operation memory data to the master unit begins.

```
LOAD MIDI DATA
RUN!
```

During transmission, the master unit tone indicators light in sequence from A1 through H8. Transmission is complete in approximately 15 seconds, and the next display is produced.

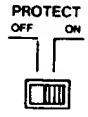
```
LOAD MIDI DATA
OK!
```

(This display produced on the master unit when the data is received form the slave.)

NOTE:
Once LOAD is complete:

① Use the VALUE ▼▲ keys to change the display in step 3 to TONE DATA = DIS for both units.

② Set the PROTECT switch of the master unit to ON.



NOTE:
If the following display is produced when the YES key (CURSOR ▶ key) is pressed, the master unit:

① Is set to TONE DATA = DIS.

② MIDI ON/OFF key is set to OFF (indicator not lit).

③ Master unit PROTECT switch is set to ON.

```
MIDI
DISABLE
```

NOTE:
The following display is produced when the YES (▶) key is pressed under the following conditions:

① Master send channel (KBCH) does not match slave receive channel (CH).

② MIDI cord not connected correctly

③ Slave TONE DATA = DIS

④ Slave MIDI ON/OFF = OFF

⑤ Slave keyboard or switches operated during data transmission.

```
LOAD MIDI DATA
*ERROR*
```

Once the problem is identified, try again from the beginning.

NOTE

MIDI SAVE/LOAD SUSPENSION

Press the CARTRIDGE/MIDI key to suspend SAVE/LOAD operations during the transmission of the 64 internal tone data and the 64 operation memory data. The LCD will appear as follows to indicate that communications have been suspended.

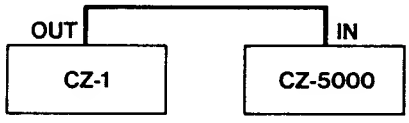
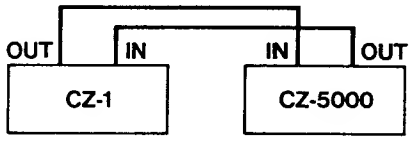


(LOAD)

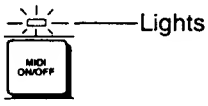
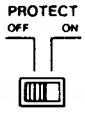
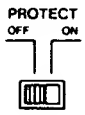
```
SAVE MIDI DATA
*ERROR*
```

(2) CZ-1↔CZ-5000

The CZ-1 can communicate the following tone data when connected to a CZ-5000:
ⓐ 32 CZ-1 tone data (E1 ~ H8) saved to CZ-5000 MEMORY BANKS (A1 ~ D8).
ⓑ 64 tone data (32 PRESET + 32 MEMORY) saved to the CZ-1 internal banks (A1 ~ H8).

	ⓐ CZ-1→CZ-5000 (SAVE)	ⓑ CZ-1←CZ-5000 (LOAD)
1	Connect the MIDI OUT of the CZ-1 unit to the MIDI IN of the CZ-5000. 	Connect the MIDI OUT of the CZ-1 unit to the MIDI IN of the CZ-5000, and the MIDI IN of the CZ-1 to the MIDI OUT of the CZ-5000. 

2	① Match the send channel (KBCH) of the CZ-1 with the receive channel (CH) of the CZ-5000.
	② PRG = ENA for both units.
	`POLY KBCH=01`
	`CH=01 PRG=ENA`
	CZ-1 (POLY mode)
	`POLY KBCH=01`
	`CH=01 PRG=ENA`
	CZ-5000 (POLY mode)
	③ Press the PAGE UP (or PAGE DOWN) for both units, and use the VALUE ▼▲ keys to set TONE DATA = ENA.
	`SYSTEM EXCLUSIVE`
	`TONE DATA=DIS` → Press VALUE key. → `SYSTEM EXCLUSIVE`
	`TONE DATA=ENA`	

3	Confirm that the MIDI ON/OFF indicators of both units are ON. 	
4	Set the PROTECT switch of the CZ-5000 to OFF. 	Set the PROTECT switch of the CZ-1 unit to OFF. 

5	The display illustrated appears when the CARTRIDGE/MIDI key is pressed followed by the PAGE UP (or PAGE DOWN) key.
	`MIDI`
	`SAVE OR LOAD`	

6

The following display is produced when the SAVE key (VALUE ▼ key) is pressed.

```
SAVE MIDI DATA
(Y/N)?
```

The following display is produced when the LOAD key (VALUE ▲ key) is pressed.

```
LOAD MIDI DATA
(Y/N)?
```

7

The following display is produced when the YES key (CURSOR ▶ key) of the CZ-1 is pressed while holding down the SUSTAIN key, and transmission of 32 CZ-1 internal tone data (E1 ~ H8) to the CZ-5000 unit begins.

```
SAVE MIDI DATA
RUN!
```

The following display appears when transmission is complete.

```
SAVE MIDI DATA
OK!
```

NOTE:

- Tone name data are not sent from the CZ-1 to the CZ-5000.
- VELOCITY data and LEVEL data are not sent from the CZ-1 to the CZ-5000. Therefore, some difference exists between the sound of tones produced on the CZ-1, and those produced on the CZ-5000 after data receipt.

The following display is produced when the YES key (CURSOR ▶ key) of the CZ-1 is pressed while holding down the SUSTAIN key, and transmission of 32 CZ-5000 preset tone data to the CZ-1 internal bank (A1 ~ H8) begins.

```
LOAD MIDI DATA
RUN!
```

The following display appears when transmission is complete.

```
LOAD MIDI DATA
OK!
```

NOTE:

- VELOCITY and LEVEL data are sent as the values indicated below.

VELOCITY (DCA1 & 2).

```
VELOCITY  AMP=00
WAVE=00 PITCH=00
```

LEVEL (DCA1 & 2)

```
LINE VOLUME
LEVEL=15
```

NOTE:
When transmission is complete:
① Change displays in step ③ to TONE DATA = DIS.
② Set the PROTECT switches on both units to ON.

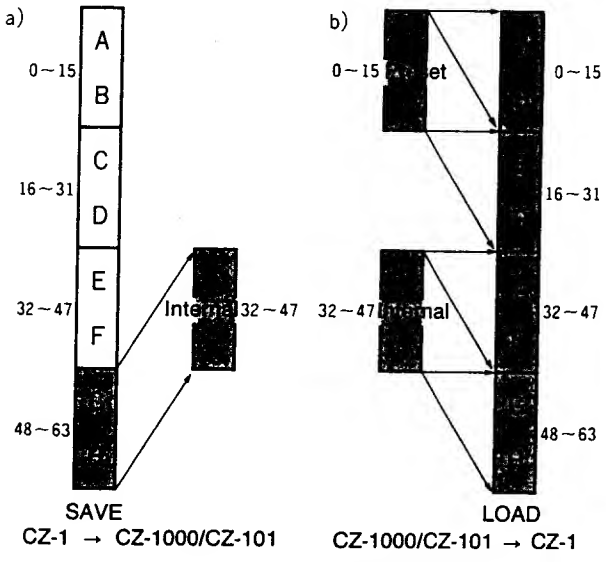
(3) CZ-1↔CZ-1000/CZ-101

The following tone data can be communicated between the CZ-1 and a CZ-1000/CZ-101.

a) 16 CZ-1 tone data (G1 ~ H8) saved to the internal bank (1 ~ 16) of the CZ-1000/CZ-101.

b) 32 CZ-1000/CZ-101 (16 preset + 16 internal) loaded to CZ-1 internal bank.

The relationship between the CZ-1 and CZ-1000/CZ-101 areas are as shown below.



SAVE
CZ-1 → CZ-1000/CZ-101

LOAD
CZ-1000/CZ-101 → CZ-1

*The same tones are loaded to AB and CD, EF and GH of the CZ-1.

The operation of a) and b) are the same as CZ-1 ↔CZ-5000 tone data communications (see page 61).

SYSTEM INITIALIZE

The system initialize procedure initializes all of the internal memories of the CZ-1, including internal tone data and operation data.

① While the power of the unit is OFF, press and hold down the INITIALIZE key and switch power ON.



② Press the YES key in the DATA ENTRY SECTION while holding down the INITIALIZE key.
This procedure initializes the entire internal memory of the CZ-1 to the values shown in TABLE 1.

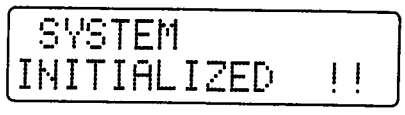


TABLE 1 INITIALIZED DATA

INITIALIZED DATA	INITIALIZED VALUES
64 internal tones	Same as 64 preset tones
Operation data	Same as 64 factory preset operations
MASTER TUNE	A_4 = 442Hz
KEY TRANSPOSE	KEY = C
PORTAMENTO	SWEEP = 0, TIME = 30
GLIDE	NOTE = −02, TIME = 30
BEND RANGE	RANGE = 03
MOD. WHEEL DEPTH	DEPTH = 50
MOD. AFTER TOUCH DEPTH	DEPTH = 50
AMP. AFTER TOUCH RANGE	RANGE = 00
TONE MIX mode	TONE 1: Internal A-1, LEVEL = 15 TONE 2: Internal A-1, LEVEL = 15
KEY SPLIT mode	LOWER: Internal A-1, LEVEL = 15 UPPER: Internal A-1, LEVEL = 15
5 COMPARE/RECALL areas	All internal (preset) A-1
CHORUS ON/OFF	All ON
TONE2 PITCH	(+)OCT = 0, NOTE = 00, FINE = 00
SUS. PEDAL ENA/DIS	LOWER = ENA, UPPER = ENA
OCT. SHIFT	LOWER = +0, UPPER = +0
MIDI	POLY: KBCH = 01, CH = 01 MULT1: CH1 ~ 8 (each POLY = 1, LEVEL = 15)

CARE OF YOUR UNIT

1. Avoid heat, humidity, and direct sunlight.

Do not overexpose the unit to direct sunlight, place it near a heater, or in any area subject to high temperature.

2. Severe impacts can result in malfunction.

When carrying or transporting the unit, protect the keyboard and buttons by packing with soft cloth.

3. Keep the unit free of liquids, dust, particles, etc.

Do not allow foreign matter to enter between the keys. Be especially careful of metallic objects such as hairpins, sewing needles or coins. Also, do not allow the unit to get wet.

4. Never attempt to modify any part of the unit.

Your keyboard is a precision musical instrument made up of sophisticated electronic parts. Any modification of, or tampering with internal components can cause trouble or malfunction.

5. Do not use lacquer thinner or similar chemicals for cleaning.

Clean the keyboard with a soft cloth dampened with a mild detergent solution. Soak the cloth in the detergent solution and squeeze it until almost dry.

6. In case of malfunciton ...

Check whether buttons and connections are set correctly as indicated in this manual. If the unit still does not work properly, contact the original retailer or a nearby dealer. Never attempt to repair the unit yourself. This can result in serious damage of the components.

SPECIFICATIONS

Model:	Digital synthesizer CZ-1
Keyboard:	61 keys, 5 octaves
Touch response:	Initial touch/after touch
Sound source:	PD (phase distortion) system
Tones:	16 (1 DCO), 8 (2 DCO), 4 (TONE MIX), 1 (SOLO)
Modes:	NORMAL / TONE MIX / KEY SPLIT / OPERATION MEMORY
Programmer:	64 tones (internal), 64 tones (preset), 64 tones (cartridge), 5 tones (compare/recall), 64 operations (NORMAL/TONE MIX/KEY SPLIT), WRITE, EXCHANGE
Parameters:	DCO1/DCO2: Waveform (33 types), pitch envelope (STEP = 1 ~ 8, RATE = 00 ~ 99, LEVEL = 00 ~ 99, SUSTAIN, END) DCW1/DCW2: Key follow (RANGE = 0 ~ 9), wave envelope (STEP = 1 ~ 8, RATE = 00 ~ 99, LEVEL = 00 ~ 99, SUSTAIN, END) DCA1/DCA2: Key follow (RANGE = 0 ~ 9), amp envelope (STEP = 1 ~ 8, RATE = 00 ~ 99, LEVEL = 00 ~ 99, SUSTAIN, END) Line volume level (LEVEL = 01 ~ 15) Velocity (AMP = 00 ~ 15, WAVE = 00 ~ 15, PITCH = 00 ~ 15) Vibrato (WAVE = 1 ~ 4, DELAY = 0 ~ 99, RATE = 0 ~ 99, DEPTH = 0 ~ 99) Octave (RANGE = −1, +0, +1) Detune (+/−, OCT = 0 ~ 3, NOTE = 0 ~ 11, FINE = 0 ~ 60) Line select (1/2/1 + 2'/1 + 1') Ring modulation/noise modulation Name (16 characters), Parameter copy, Initialize
Tone mix:	TONE 1 (LEVEL = 01 ~ 15), TONE 2 (LEVEL = 01 ~ 15)
Key split:	Split point (01 ~ 60), LOWER (LEVEL = 01 ~ 15), UPPER (LEVEL = 01 ~ 15)
Effect/Overall control:	Portamento sweep (0, 1), portamento time (00 ~ 99), portamento ON/OFF, glide note (−24 ~ +24), glide time (00 ~ 99), glide ON/OFF, pitch bend, bend range (00 ~ 12), modulation wheel depth (00 ~ 99), modulation after touch depth (00 ~ 99), modulation ON/OFF, amp after touch range (00 ~ 15) NORMAL mode: Chorus ON/OFF TONE MIX mode: TONE 2 PITCH (+/−, OCT = 0 ~ 3, NOTE = 00 ~ 11, TIME = 00 ~ 60), chorus ON/OFF (TONE 1, 2) KEY SPLIT mode: Sustain pedal ENA/DIS (LOWER/UPPER), octave shift (LOWER = 0 ~ +2, UPPER = −2 ~ 0), chorus ON/OFF (LOWER/UPPER) Master tune (±100 cents) Key transpose (G ~ F#) Master volume Chorus control
Data entry:	Value ▼ (SAVE)/ ▲ (LOAD), CURSOR ◀ (NO)/ ▶ (YES), envelope point (SUSTAIN, END), PAGE DOWN/UP
LCD:	Dot matrix (32 characters)
Data SAVE/LOAD:	Cartridge SAVE/LOAD, MIDI SAVE/LOAD

MIDI:	POLY mode: Send channel = 01 ~ 16 Receive channel = 01 ~ 16 Program change = ENABLE/DISABLE MULTI CHANNEL mode: Basic channel = 01 ~ 16 Voice channel = 01 ~ 16 (each POLY = 0 ~ 8, each LEVEL = 01 ~ 15) Program change = ENABLE/DISABLE Communication control: MIDI ON/OFF, system exclusive TONE DATA = ENABLE/DISABLE
Other:	Solo ON/OFF
Rear panel:	Line out terminal (A/A + B, B), headphone terminal (stereo), sustain terminal, foot volume terminal, MIDI terminal (IN, OUT, THRU), protect switch (ON/OFF), cartridge slot, power supply terminal
Power supply:	100V, 120V, 220V, 240V AC
Memory back up:	Built-in lithium battery (life: approx. 5 years)
Power consumption:	30W
Dimensions:	1025(W) × 341(D) × 127(H)mm ($40^{3}/_{8}$"(W) × $13^{7}/_{16}$"(D) × 5"(H))
Weight:	13kg (28.7 lbs.)
Accessories:	AC power cord, plug and cord set, dust cover

**Designs and specifications are subject to change without notice.*

WARNING:
CHANGING THE VOLTAGE SELECTOR MAY REQUIRE THE USE OF A DIFFERENT LINE CORD OR ATTACHMENT PLUG, OR BOTH. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

GUIDELINES LAID DOWN BY FCC RULES FOR USE OF THE UNIT IN THE U.S.A. (not applicable to other areas).

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

..... reorient the receiving antenna
..... relocate the computer with respect to the receiver
..... move the computer away from the receiver
..... plug the computer into a different outlet so that computer and receiver are on different branch circuits.

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

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