COSMOSYNTHESIZER
CZ-5000

Thank you for purchasing the Casio CZ-5000. The CZ-5000 is a totally digital synthesizer under LSI (large scale integrated circuit) control, and is designed using the same principles that apply to analog synthesizers, thus eliminating the frequently heard complaint about digital synthesizers that they are too complex. This makes the unit actually a hybrid that combines the operational ease of an analog synthesizer with the tonal quality of a digital model.

The CZ-5000 also features a built-in digital sequencer essential for multi-track recording (MTR). This means that multiple track compositions free of noise can be produced easily. Adding another keyboard (with MIDI) also allows further performance versatility.

4 Modes of the CZ-5000

1 NORMAL MODE

- Play of preset timbres.
- Modification of timbre data recalled from memory.
- Creation of new sounds.
- Application of various effects to timbres.
- Saving of timbres created to built-in memory or external memory (commercially available cassette tape or optional RAM cartridge).

2 TONE MIX MODE

- Mixing of any two timbres.
- Independent setting of each timbre level.

3 KEY SPLIT MODE

- Splitting of the keyboard into UPPER and LOWER portions for independent play of two timbres.
- Independent setting of each timbre level and effect.

4 SEQUENCER MODE

- Recording of real time input from the keyboard. (8 tracks maximum.)
- Recording of manual input. (8 tracks maximum.)
- Keyboard play along with replay of recorded tracks.
- Independent setting of each timbre level and effect.
- Saving of recorded data of sequencer to external memory (commercially available cassette tape).

CONTENTS

Power Switch

①OVERALL CONTROL SECTION [TOTAL CONTROL]

Indicator
TOTAL CONTROL

ON/OFF

MASTER TUNE key
KEY TRANSPOSE key

GLIDE ON/OFF key
PORTAMENTO ON/OFF key

STEREO CHORUS

Chorus Control

VOLUME

Master Volume

•MASTER TUNE key
Used to adjust the pitch of the entire key-board within the range of ±100 cent (half tone).

•KEY TRANSPOSE key
Transposes selections in half tone incre-ments within the range of G through F#.

•PORTAMENTO ON/OFF key
Switches portamento ON and OFF. The in-dicator above the key lights when ON, and portamento is applied according to the por-tamento time set using the PORTAMENTO key in the Effect Section ⑨.

•GLIDE ON/OFF key
Switches glide ON and OFF. The indicator above the key lights when ON, and glide is applied according to the NOTE and TIME values set using the GLIDE key in the Effect Section ⑨.

•Master Volume
Adjusts the volume levels for the head-phone and LINE OUT output.

•Chorus Control
Adjusts the chorus effect.

② MODE SELECT SECTION

The keys in this section are used to select one of the four modes available with the CZ-5000.

③ SOLO KEY

Switches between monophonic (ON) and polyphonic (OFF) play. An indicator will light above the key when ON.

④ MIDI KEY

Set to the ON position to specify the send/receive status when a MIDI instrument or personal computer is connected to the MIDI terminal on the back panel of the keyboard. (See page 49.)

⑤ PROGRAMMER SECTION

A total of 64 timbres are contained in memory (32 PRESET and 32 MEMORY). The keys in this section are used to select one of these timbres and to write timbres to memory.
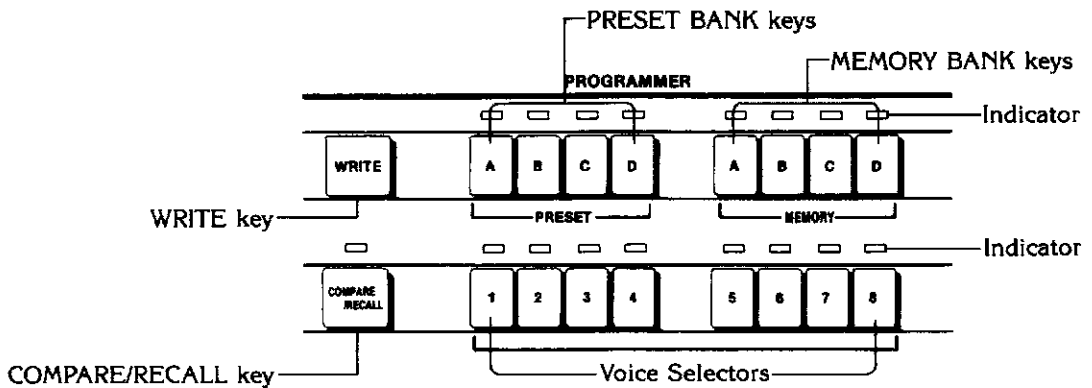
•PRESET BANK keys
Used to select one of the four preset banks. An indicator will light above the key pressed.

•MEMORY BANK keys
Used to select one of the four memory banks. An indicator will light above the key pressed.

•Voice Selectors
Used to select one of the eight timbre memories in the selected bank. An indicator will light above the key pressed, and a message will appear on the LCD as shown in the following illustration.

PRESET BANK C, tone number 2

MEMORY BANK A, tone number 4

•WRITE key
Records timbres created using the Parameter Section ⑩ in the MEMORY BANK.

•COMPARE/RECALL key
Compares a timbre created by modifying a voice recalled from memory with the original (unmodified) voice. The modified timbre is temporarily stored in the COMPARE/RECALL area of memory and the COMPARE/RECALL function is automatically turned ON (indicator lights above key). The original voice is recalled when OFF and the modified timbre is recalled when ON.

⑥ LIQUID CRYSTAL DISPLAY (LCD)

Such information as voice numbers, voice names, parameters and data appears on the LCD as the keyboard is being used.

⑦ DATA ENTRY SECTION
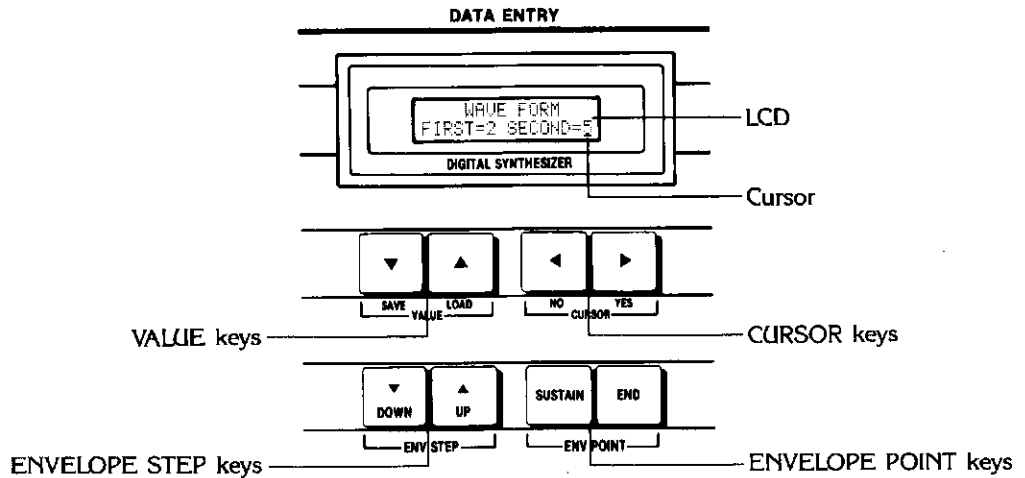
•VALUE keys
Changes the data displayed on the LCD. Pressing ▼ decreases the value by 1, while pressing ▲ increase the value by 1. Holding down either key will cause the value to continuously increase/decrease. Also used for SAVE and LOAD operations with a RAM cartridge (optional) or commercially available cassette tape. (See page 29, 47.)

•CURSOR key
Moves the cursor (blinking mark below the data) on the LCD. Basically, each press of the ◄ key moves the cursor one position to the left, while each press of the ► key moves the cursor one position to the right when multiple data are being displayed.
*The ◄ (YES) and ► (NO) cursor keys are also used for SAVE and LOAD operations using a RAM cartridge (optional) or commercially available cassette tape (page 29, 47), INITIALIZE of the timbre data (page 24).

•ENV STEP keys
Used to adjust the envelope steps of each DCO, DCW and DCA envelopes provided in the Parameter Section ⑩. Each press of the ▼ lowers the step while each press of the ▲ raises the step.

•ENV POINY keys
Used to specify the SUSTAIN POINT and END POINT of each DCO, DCW and DCA envelope provided in the Parameter Section ⑩.

⑧ MT key & Cartridge key

The keys in this section are used in connection with a RAM cartridge (optional) or commercially available cassette tape for saving or loading MEMORY BANK data or Sequencer Section ⑪ data.
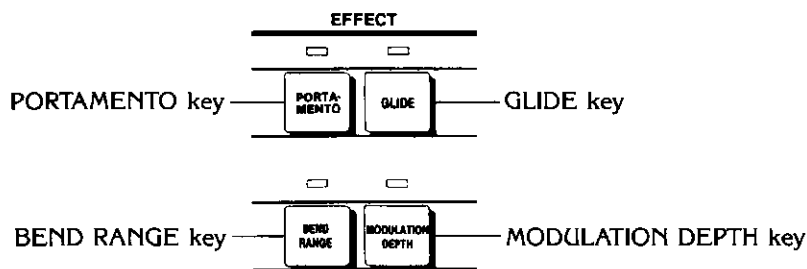
•MT key
Press as the initial step for performing SAVE and LOAD operations between the keyboard and a commercially available cassette tape. (See page 29, 47.)

•CARTRIDGE key
Press as the initial step for performing SAVE and LOAD operation between the keyboard and an optional RAM cartridge. (See page 27.)

⑨ EFFECT SECTION

The keys in this section are used to set data for applying four types of effects to all timbres using the ON/OFF keys and PITCH BEND/MODULATION wheels. Any data modification is performed using the Data Entry Section ⑦.

```
                              EFFECT
                          ┌──────────┐
                          ☐        ☐
           ┌──────────┐ ┌──────┐┌──────┐
PORTAMENTO key ─────────│ PORTA-││ GLIDE│────── GLIDE key
                        │ MENTO ││      │
                        └──────┘└──────┘

                          ☐        ☐
           ┌──────────┐ ┌──────┐┌──────────┐
BEND RANGE key ─────────│ BEND ││MODULATION│────── MODULATION DEPTH key
                        │ RANGE││  DEPTH   │
                        └──────┘└──────────┘
```

•PORTAMENTO key
Used to set the portamento time. Portamento is applied according to the set value when the PORTAMENTO ON/OFF key of the Overall Control Section ① is ON.

•GLIDE key
Used to set the glide time. Glide is applied according to the set value when the GLIDE ON/OFF key of the Overall Control Section ① is ON.

•BEND RANGE key
Used to set the PITCH BEND ⑭ variation range.

•MOD DEPTH key
Used to set the MODULATION ⑬ variation range. The MODULATION WHEEL ⑬ operates in the range of the set value when the MODULATION ON/OFF key ⑫ is ON.

⑩ PARAMETER SECTION

All parameters of timbre data are set using the keys in this section. All data modifications (except for line select parameters) are performed using the Data Entry section ⑦.
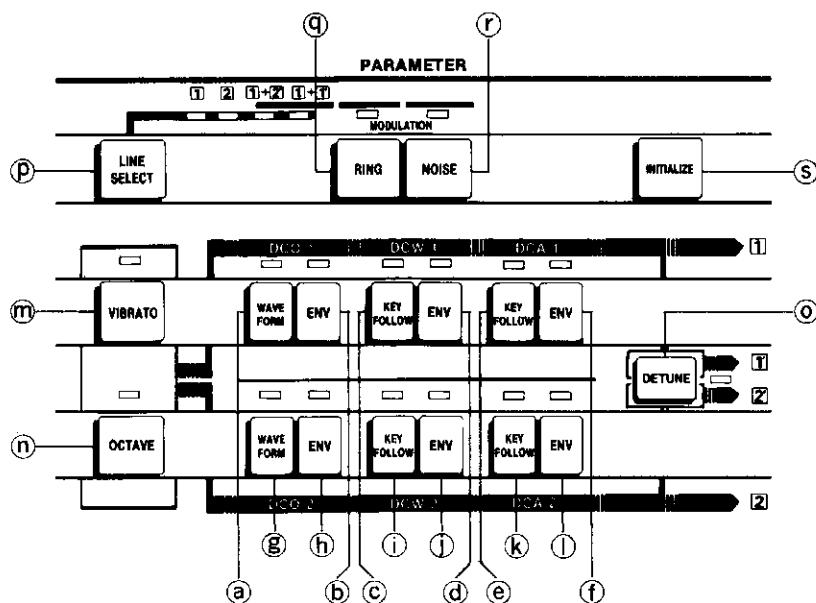
ⓐ WAVE FORM key
Press this key when you want to select the basic wave form for Line 1. An indicator lights above this key when ON.

ⓑ DCO envelope key
This key lets you set the pitch envelope for Line 1. An indicator lights above this key when ON.

ⓒ DCW KEY FOLLOW key
Press to make the wave form of the Line 1 DCW approach a pure sine wave according to the pitch of the keys being played.

ⓓ DCW envelope key
Press to set the wave envelope for Line 1. An indicator lights above this key when ON.

ⓔ DCA KEY FOLLOW key
Used to set the time variance between the upper and lower registers of the keyboard for DCA 1.

ⓕ DCA envelope key
Press to set the parameters of the Line 1 amplifier envelope. An indicator lights above this key when ON.

ⓖ WAVE FORM key
Press to select the basic wave form for Line 2. An indicator lights above this key when ON.

ⓗ DCO envelope key
Sets the pitch envelope for Line 2. An indicator lights above this key when ON.

ⓘ DCW KEY FOLLOW key
Press to make the wave form of the Line 2 DCW approach a pure sine wave according to the pitch of the keys being played.

ⓙ DCW envelope key
Press to set the wave envelope for Line 2. An indicator lights above this key when ON.

ⓚ DCA KEY FOLLOW key
Used to set the time variance between the upper and lower registers of the keyboard for DCA 2.

ⓛ DCA envelope key
Press to set the parameters of the Line 2 amplifier envelope. An indicator lights above this key when ON.

ⓜ VIBRATO key
Press to set the vibrato effect independently for each tone. Data setting itself is performed in the Data Entry section.

ⓝ OCTAVE keys
Press to shift the pitch range of each tone up or down in one octave steps. Data setting itself is performed in the Data Entry section.

ⓞ DETUNE key
Press to detune the pitch of Line 1 or Line 2 without changing the tone, for Line 1' or Line 2'.

ⓟ LINE SELECT key
Changes line select in the order $\boxed{1}$ → $\boxed{2}$ → $\boxed{1}$ + $\boxed{1'}$ → $\boxed{1}$ + $\boxed{2}$. The indicator above the selected line combination lights up.

ⓠ RING key
Causes Line 1' or Line 2' to be ring modulated by Line 1. An indicator lights above this key when ON.

ⓡ NOISE key
Causes Line 1' or Line 2' to be modulated by noise. An indicator lights above this key when ON.

ⓢ INITIALIZE key
Initializes the settings of the various parameters (sets the respective data to 0), thus making it easier to start creating sounds right from the beginning. Press the INITIALIZE key and simultaneously press the key of the parameter to be initialized.

⑪ SEQUENCER SECTION

The keys in this section are used for real time or manual note input for up to 8-tracks of recording and playback.
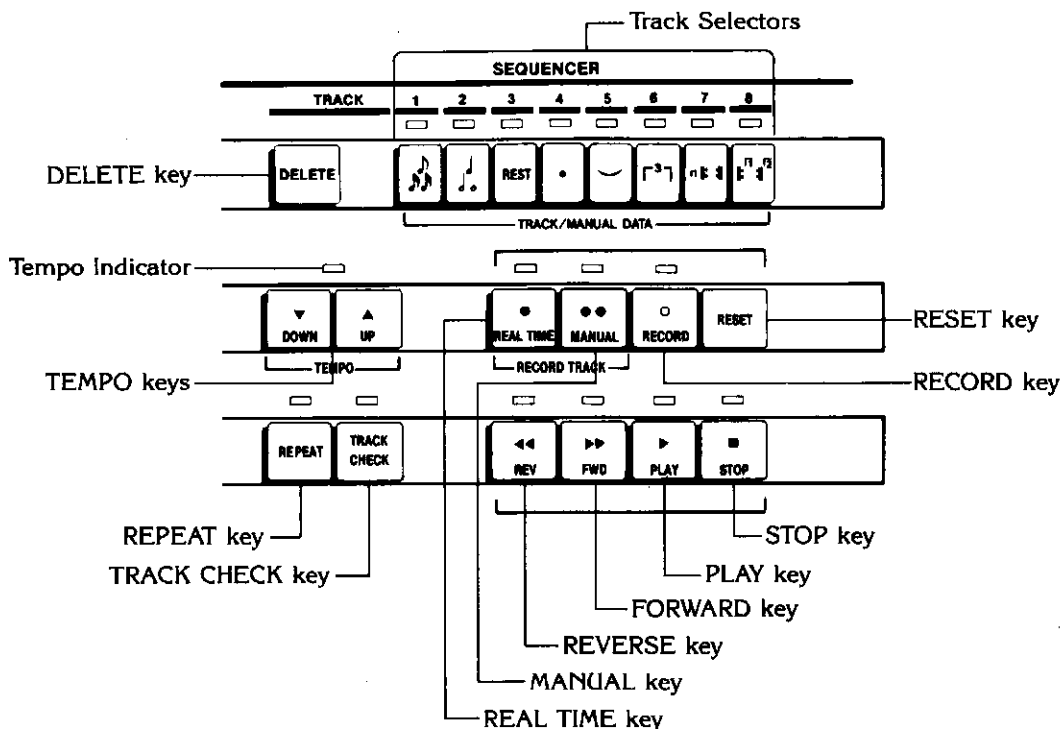
•Track Selectors
Used to select tracks for recording, playback or track check. Indicators light above the corresponding keys to show the tracks selected. Also used during manual recording to input notes, rests, repeat symbols, etc.

•REAL TIME key
Used to specify tracks for real time recording. Once a recording track is selected, the indicator above this key will light and the indicator above the corresponding key for the track selected will flash. Also used to display the remaining memory capacity.

•MANUAL key
Used to specify tracks for manual recording.

•RECORD key
Initiates real time recording.

•RESET key
Suspends recording and playback and returns to the beginning of the piece.

•REV key
Reverses the sequencer during recording and playback. During real time recording, playback will begin from the point at which the REV key is released, and adding to an existing recording will be possible.

•FWD key
Advances the sequencer at high speed during recording and playback.

•PLAY key
Commences playback. Also used to add to an existing recording.

•STOP key
Suspends recording or playback at any desired position.

•DELETE key
Used to delete a portion of data during manual recording. Also used to delete individual tracks of data.

•Tempo Indicator
Flashes for each beat during playback or real time recording.

•TEMPO keys

Used to adjust the speed (tempo) of the playback. Tempo can be set to any one of 45 speeds within the range of ♩= 40 ~ ♩= 256, and a numeric value representing the tempo is displayed on the LCD.

•REPEAT key

Used for repeat playback.

•TRACK CHECK

Used to change the timbre and volume level, as well to turn portamento and glide ON and OFF for tracks already recorded.

⑫ MODULATION ON/OFF KEY

⑬ MODULATION WHEEL

Turned to adjust the vibrato depth according to the variation range set using the MOD DEPTH key in the Effect Section ⑨.

⑭ PITCH BEND WHEEL

Turned to control the pitch according to the variation set using the BEND RANGE key in the Effect Section ⑨.

⑮ KEYBOARD

PERIPHERALS

The CZ-5000 is not equipped with built-in speakers. A keyboard amp is required except when using headphones.

•Connection Diagram

⑤ FOOT VOLUME terminal
⑥ SUSTAIN terminal
⑦ MT terminal
⑨ Cartridge slot
⑧ PROTECT switch
② LINE OUT terminal (R/L)
③ PHONES terminal
① Power terminal

CASIO

④ MIDI terminals

100V AC outlet
Accessory power cord

Data recorder or cassette recorder

Sustain pedal

Foot volume control

Keyboard amp (AS-3000, AS-2000, etc.)

Headphones
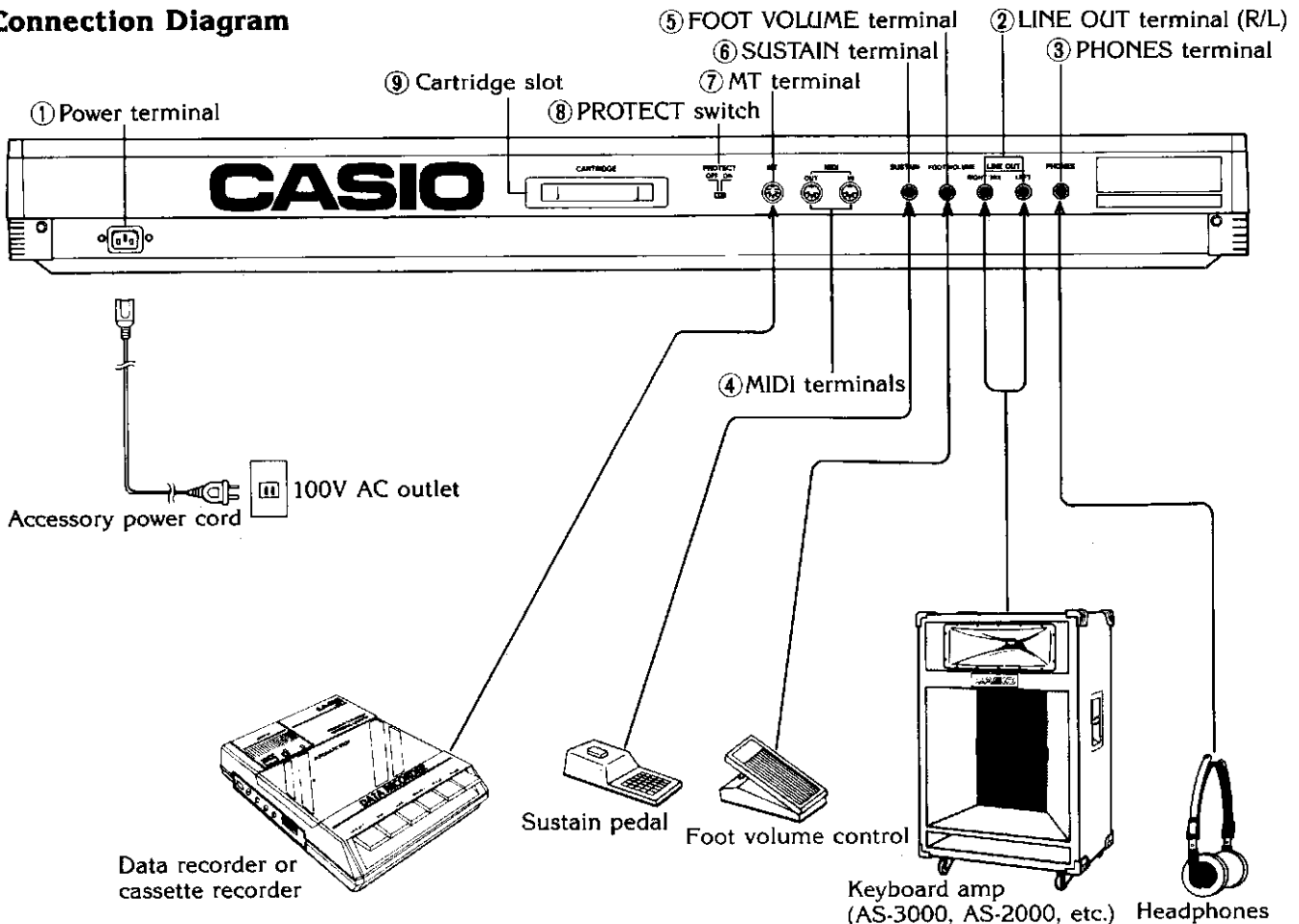
① POWER TERMINAL

For connection of accessory power cord.

② LINE OUT TERMINAL (RIGHT/LEFT)

For connection of a speaker with a built-in keyboard amp (such as the optional AS-3000).
*Stereo output is only possible when both the RIGHT and LEFT terminals are connected to speakers.
Connecting only one of the two terminals will result in monaural output.

③ PHONES TERMINAL

For connection of headphones.

④ MIDI TERMINALS

For connection of another keyboard or a computer equipped with MIDI terminals.

⑤ FOOT VOLUME TERMINAL

For connection of a foot volume pedal (optional VP-2) which allows fine adjustments of volume during keyboard play.
*Volume is not raised when the foot volume pedal is not pressed or when the main volume of the keyboard is set to MIN.

⑥ SUSTAIN TERMINAL

For connection of a sustain pedal (optional SP-1). Sustain effect applied when pedal is pressed.

⑦ MT TERMINAL

For connection of a data recorder or cassette recorder. A built-in interface allows SAVE/LOAD operations (using commercially available cassette tape) of timbre data created with the keyboard or data played using the Sequencer Section.

⑧ PROTECT SWITCH

Used to protect against erasure of timbre data from the Programmer section or data played using the Sequencer Section.

MEMORY PROTECT FUNCTION

WRITE is impossible and data LOAD from an optional RAM cartridge or cassette tape is impossible when the PROTECT switch is in the ON position. This protects against inadvertently erasing data (see page 26). The switch should usually be kept ON and only be set to OFF for WRITE and LOAD operations.

PROTECT
OFF   ON

Usually left ON

---
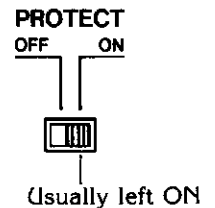
⑨ CARTRIDGE SLOT

For loading separately available RAM carridges. (See page 27.)

OPTIONS (SEPARATELY AVAILABLE)

* Keyboard amp (AS-3000)
* Keyboard amp (AS-2000)
* Keyboard amp (AS-20)
* Volume foot control (VP-2)
* Sustain pedal (SP-1)

* Headphones (CP-2)
* RAM cartridge (RA-3)
* Stand (CS-2)
* Stand (CS-5)
* Protective case (HC-16)

*All options should be available from dealers that handle the CZ series.

•First, turn power ON by pressing the power switch located to the right of the keyboard. The display will appear as shown here when power is switched ON.
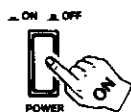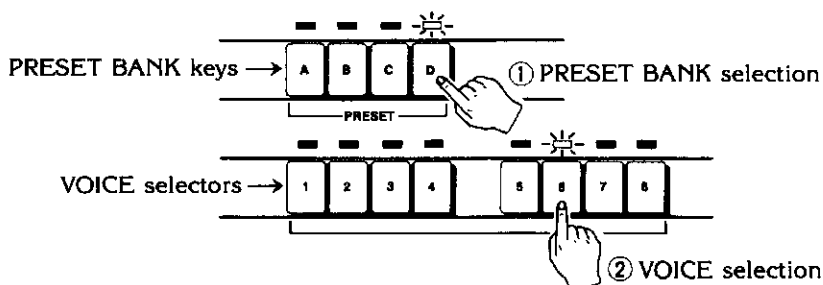
```
*PRESET* A-1
BRASS ENS.1
```

Display when power is switched ON.

At this time the keyboard is set to the NORMAL mode and the Programmer Section automatically recalls PRESET A—1, BRASS ENSEMBLE.
32 preset voices selected using the PRESET BANK keys and VOICE selectors can be used for keyboard play.

PRESET BANK keys → [A][B][C][D] ① PRESET BANK selection
                        └── PRESET ──┘

VOICE selectors → [1][2][3][4]   [5][6][7][8]
                                                    ② VOICE selection

*The name of the preset voice selected will be shown on the LCD.

PRESET VOICE TABLE

BRASS ENSEMBLE 1	SYNTH. BRASS	BRASS ENSEMBLE 2	TRUMPET
STRING ENSEMBLE 1	STRING ENSEMBLE 2	SYNTH. STRINGS	VIOLIN*
JAZZ ORGAN	ELEC. PIANO	ACCORDION	FANTASTIC ORGAN
WHISTLE*	FLUTE*	BLUES HARMONICA	DOUBLE REED
FAT BASS	SYNTH. BASS	ELEC. GUITAR	METALLIC SOUND
VIBRAPHONE	CRISPY XYLOPHONE	SYNTH. GLOCKENSPIEL	CARIMBA
SYNTH. DRUMS	STEEL DRUM	SYNTH. PERCUSSION	CONGA
HUMAN VOICE	FAIRY TALE	CARILLON	TYPHOON SOUND.

*16-tone polyphonic (1 DCO). Ummarked are 8-tone polyphonic (2 DCO).

The memory bank is composed of 32 memory areas to which original timbre data created using the Parameter Section can be written. MEMORY BANK keys A through D and VOICE selectors 1 through 8 of the Programmer Section are used to select a memory voice for recall.

MEMORY BANK keys (A ~ D)→
① MEMORY BANK selection

VOICE selectors (1 ~ 8)→
② VOICE selection
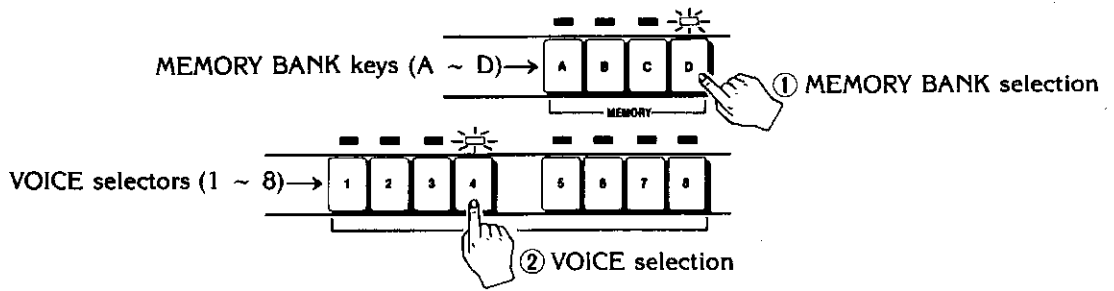
*The memory bank and voice number are displayed on the LCD.
*The 32 memories of the MEMORY BANK are set at the factory with sample tones included in the separate "DATA BOOK".

•Portamento time

The following appears on the LCD when the PORTAMENTO key in the Effect Section is ON:


```
PORTAMENTO
TIME=25
```
(00 ≤ TIME ≤ 99)
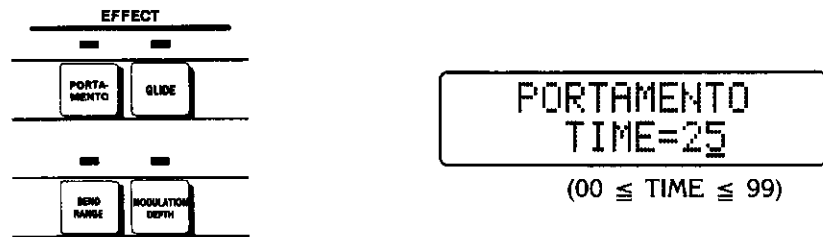
The VALUE ▼ and ▲ keys in the Data Entry Section are used to set the portamento time within a range of 00 through 99. The portamento time increases (portamento becomes slower) as the numeric value increases.

•PORTAMENTO ON/OFF

Portamento is switched ON and OFF using the PORTAMENTO ON/OFF key in the Overall Control Section.
*Portamento is only applied for legato (subsequent keys are pressed while previously pressed keys are held down) when portamento is switched ON while the SOLO key is ON.
*Portamento and glide mutually cancel each other.
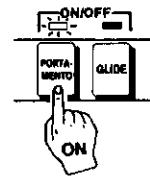
•GLIDE NOTE/TIME

The following appears on the LCD when the GLIDE key in the Effect Section is ON:

```
GLIDE
NOTE=-06 TIME=15
```
Cursor
$\begin{pmatrix} -24 \leq NOTE \leq +24 \\ 00 \leq TIME \leq 99 \end{pmatrix}$
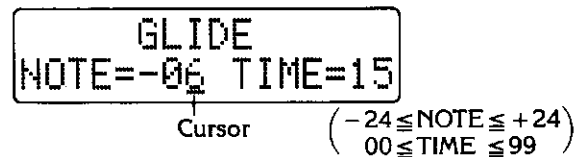
NOTE indicates the pitch divergence from standard of the key pressed. Settings are made in half-tone units in the range of 2 octaves up and down (±24 half tones). When the keyboard is pressed, the pitch successively changes from the set pitch to standard, thus producing a glide effect. The difference in pitch becomes greater as the numeric value increases.
TIME indicates the glide time and is set within the range of 00 through 99. Glide time becomes longer (glide becomes slower) as the numeric value increases.
The cursor is moved to TIME using the cursor keys in the Entry Section and the numeric value is set using the VALUE keys.

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•GLIDE ON/OFF

Glide is switched ON and OFF using the GLIDE ON/OFF key in the Overall Control Section.
*Portamento and glide mutually cancel each other.

•PITCH BEND

Pitch is controlled by turning the PITCH BEND WHEEL
located to the left of the keyboard.

Pitch increases

Pitch decreases
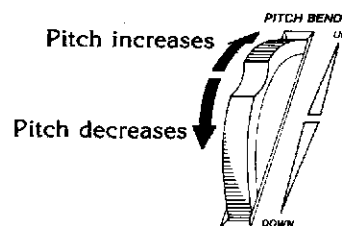
•BEND RANGE

The following appears on the LCD when
the BEND RANGE key in the Effect Sec-
tion is ON:

```
BEND RANGE
RANGE=03
```
$(00 \leq RANGE \leq 12)$

The VALUE keys in the Data Entry Section are used to set the pitch bend width at half-
tone intervals within the range of 00 through 12 (± 1 octave). Each increment of the nu-
meric value increases the bend width by ± 100 cent ($\pm$ half tone).

•MODULATION DEPTH

The following appears on the LCD when
the MODULATION DEPTH key in the
Effect Section is ON:

```
MODULATION
DEPTH=25
```
$(00 \leq DEPTH \leq 99)$

The VALUE keys in the Data Entry Section are used to set the MODULATION WHEEL depth
within a range of 00 through 99.

•MODULATION WHEEL

When the ON/OFF key above the MODULATION WHEEL is ON,
rotating the wheel away from the front of the unit (see illustra-
tion) will gradually increase the depth of vibrato. The MODU-
LATION DEPTH set in the Effect Section will be applied with
the wheel is rotated to its full (MAX) extent.
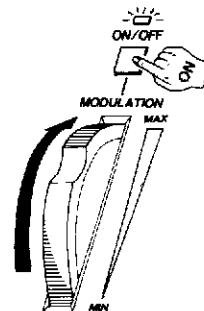
•MASTER TUNE

The following appears on the LCD when
the MASTER TUNE key is ON:

```
MASTER TUNE
PUSH VALUE KEY
```

Each press of the ▼ or ▲ VALUE key will respectively raise or lower pitch by 1.7 cent.
*Simultaneously pressing the ▼ and ▲ keys will return pitch to the standard value
(A4 = 442Hz).
*The pitch value can be successively changed at high speed by holding down either VALUE
key.

•KEY TRANSPOSE

The following appears on the LCD when
the KEY TRANSPOSE key is ON:

```
KEY TRANSPOSE
KEY=C
```

Each press of the ⬇ or ⬆ VALUE key will respectively raise or lower the key by half tone steps. The key is displayed at the cursor position.

Initial value.

$$G \leftarrow A^\flat \leftarrow A \leftarrow B^\flat \leftarrow B \leftarrow C \rightarrow C^\sharp \rightarrow D \rightarrow E^\flat \rightarrow E \rightarrow F \rightarrow F^\sharp$$

SOLO

SOLO key ON

Volume

KEY ON ①   KEY ON ②

KEY ON② simultaneously deletes note①.

SOLO key OFF

Volume

KEY ON ①   KEY ON ②

Note① remains even at KEY ON②.
(Illustration shows a non-sustained tone.)

PD (PHASE DISTORTION) SOUND SOURCE

The CZ-5000 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)

Phase angle

Waveform

Polarity ($+/-$) $\cos\theta$ reversed for sake of example.

(Fig. 2)

(Fig. 3)
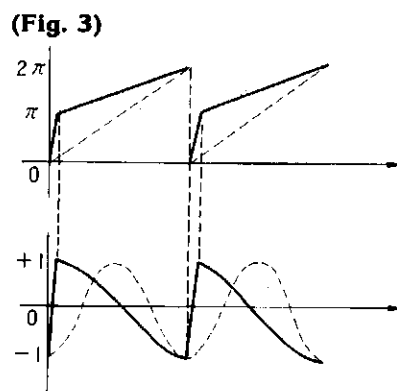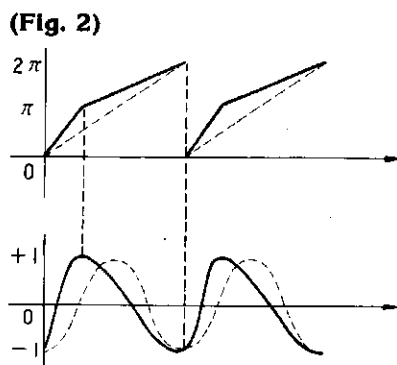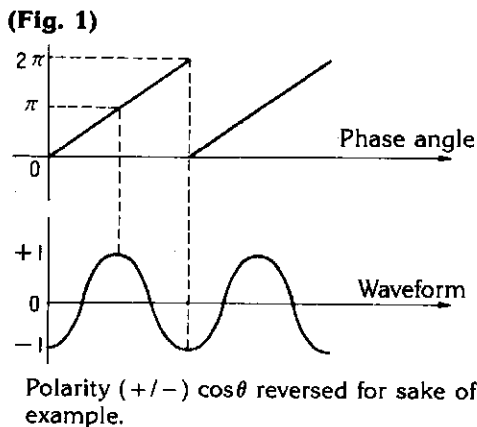
Fig. 1 illustrates output of a non-distorted cosine wave when a cosine wave in ROM is read with a linear phase angle. The phase angle is read at a constant speed from 0 through 2π.
What would happen if we increase the phase angle read speed from 0 through π and decrease it from π through 2π?

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 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 become 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.

When WAVE FORM is set to saw-tooth.

DCW envelope
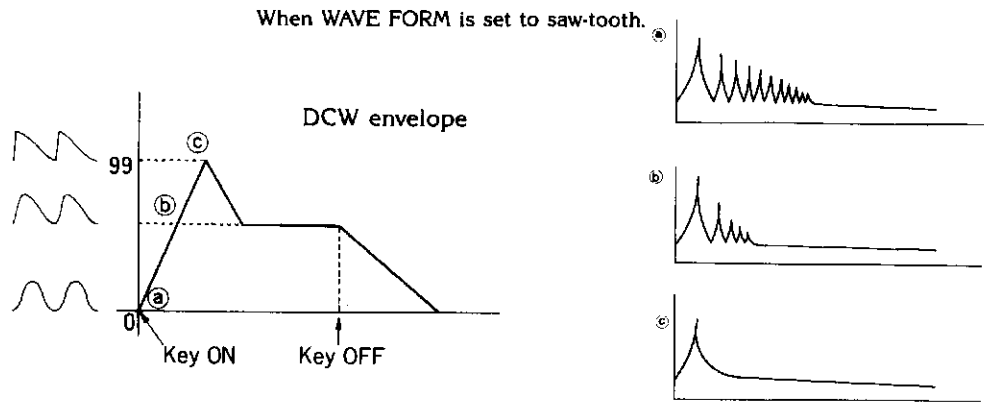
POINTS TO REMEMBER

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.

The CZ-5000 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. 1)
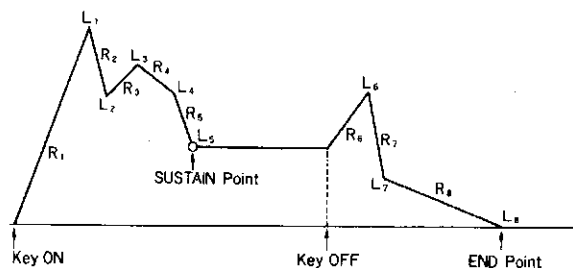
*R_1 through R_8 indicate the RATE (slope) of each various steps, while L_1 through L_8 indicate the LEVEL (destination level). L_1 is reached at a slope of R_1 in STEP 1, L_2 is reached at a slope of R_2 in STEP 2, etc.

Fig. 1 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".
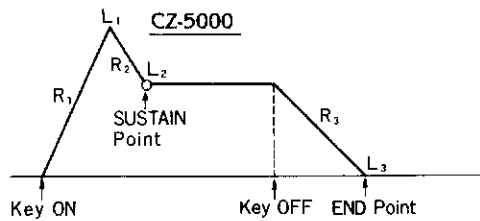
(Fig. 2)   **(Fig. 3)**
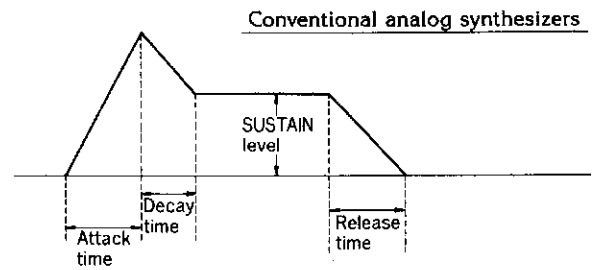
Analog synthesizers usually require the setting of envelopes according to 4 parameters: Attack time, Decay time, Sustain level and Release time (hence, the name ADSR system). With the envelope generator of the CZ-5000, only 3 step settings are required to attain the same effect.

The PD sound source of the CZ-5000 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-5000 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-5000 block configuration
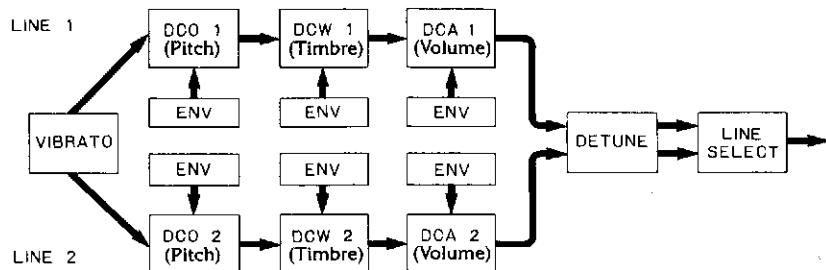
*VIBRATO is the parameter that oscillates the low frequencies of the DCO and applies a vibrato effect. Another parameter applied to DCO is OCTAVE.

■ 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 timbre. Independent settings can be made using the DCO 1 and DCO 2 keys.

As can be seen in fig. a, 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. b to produce a total of 33 waveforms suitable for virtually any application.

(fig. a) 1. SAW-TOOTH 2. SQUARE 3. PULSE 4. DOUBLE SINE **(fig. b)**

5. SAW-PULSE 6. RESONANCE I (SAW-TOOTH) 7. RESONANCE II (TRIANGLE) 8. RESONANCE III (TRAPEZOID)
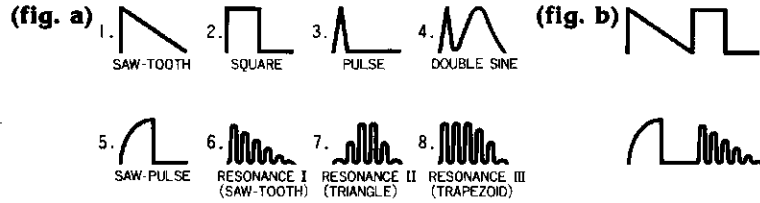
*The three RESONANCE waveforms cannot be used in combination with each other.

When the WAVEFORM key is ON, the LCD appears as shown in Fig. 1.

(Fig. 1) Indicator lights.

```
WAVE FORM
FIRST=1  SECOND=0
```
Cursor

Fig. 1 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 the another waveform can be set using the VALUE keys (see Fig. 2). This procedure is used to select one of the 32 combinations of basic waveforms.

(Fig. 2)

① Either of the CURSOR keys is used to move the cursor.
```
WAVE FORM
FIRST=1  SECOND=0
```

② The VALUE keys are used to change the numeric value.
```
WAVE FORM
FIRST=1  SECOND=2
```

*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. 3.

(Fig. 3)
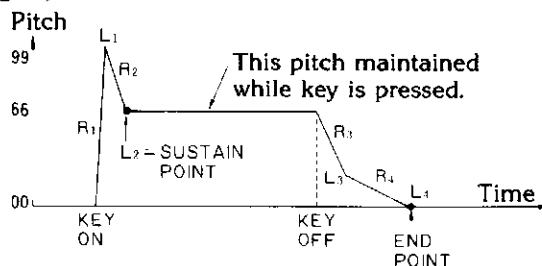
	STEP 1	STEP 2	STEP 3	STEP 4
RATE	99	72	60	20
LEVEL	99	66	24	00
SUS, END	•••	SUS	•••	END

•17•

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.
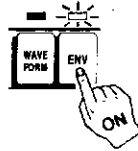
Pitch envelope STEP 1 selected.

```
PITCH STEP1   ***
RATE=m₁m₂ LEVEL=n₁n₂
```
$$\left(\begin{array}{l} 00 \leqq m_1 m_2 \leqq 99 \\ 00 \leqq n_1 n_2 \leqq 99 \end{array}\right)$$

Rate of step 1.

Destination level 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 ENV STEP ▲ 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
```

SUSTAIN POINT

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

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

⑥ Use the ENV STEP ▲ key to advance to STEP 3 and set the RATE to 60 and the LEVEL to 24.

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

END POINT

⑦ Use the ENV STEP ▲ 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.

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

LEVEL of the last step is 00.

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

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 (see page 20 for details). For the DCA envelope, LEVEL means the volume.

■ 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 difference 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. 4.)

(Fig. 4)

Key follow (DCW) for saw-tooth pattern basic waveform.
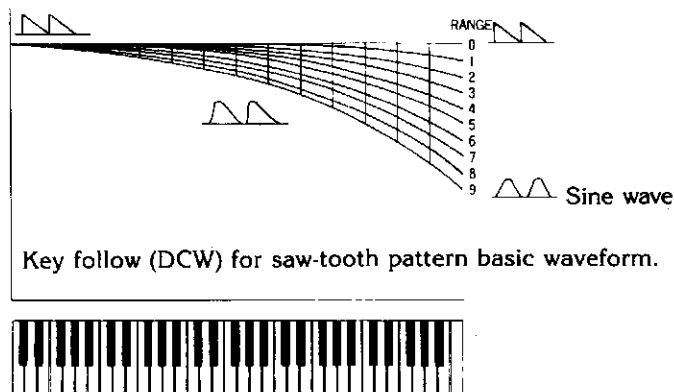
The LCD appears as in Fig. 5 when the DCW KEY FOLLOW key is pressed.

(Fig. 5)
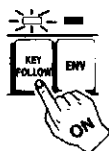
$$\text{KEY FOLLOW} \atop \text{WAVE RANGE} = n \qquad (0 \leq n \leq 9)$$

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. 6) WAVE FORM 1 (Saw-tooth)


	STEP 1	STEP 2	STEP 3
WAVE	75	60	60
LEVEL	99	50	00
SUS/END	***	SUS	END
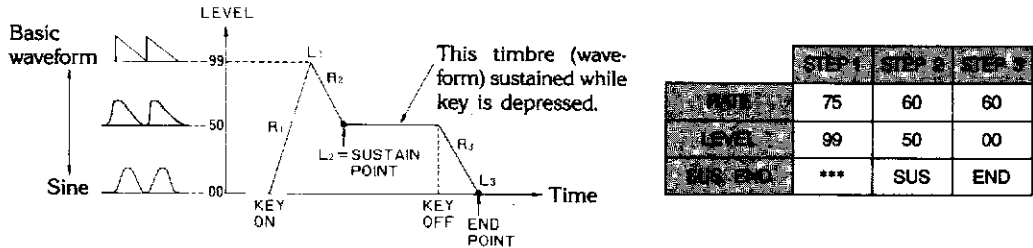
The change of timbre over time is in accordance with the DCW envelope LEVEL. A sine wave is attained when L = 00 and the basic waveform is attained when L = 99.

The LCD appears as in Fig. 7 when the DCW 1 or DCW 2 ENV key is ON.

(Fig. 7)

Wave envelope STEP 1 is selected.

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

Rate of STEP 1.   Destination level of STEP 1.

*Operational procedures are identical to those previously explained for the DCO envelope (page 18). Data is set using the VALUE, CURSOR, ENV STEP and ENV POINT SUSTAIN/END keys.

■ 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 DCW 1 and DCW 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. 8)
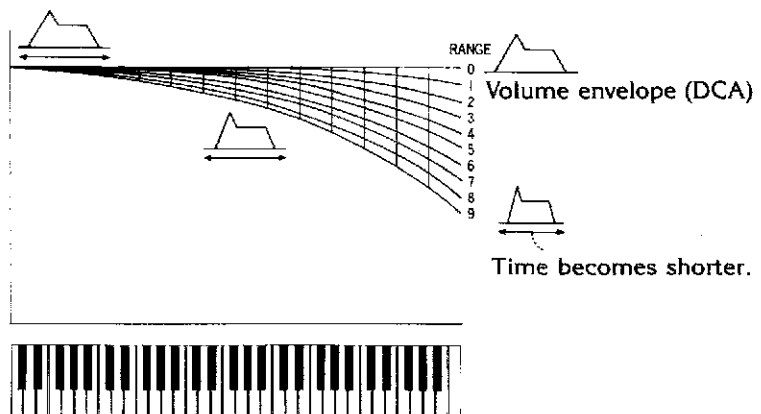
The LCD appears as in Fig. 9 when the DCA KEY FOLLOW key is pressed.

(Fig. 9)
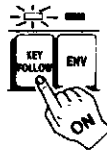
KEY FOLLOW
AMP RANGE=n

$(0 \leqq n \leqq 9)$

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 DCW 1 and DCW 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. 10) Piano amp envelope
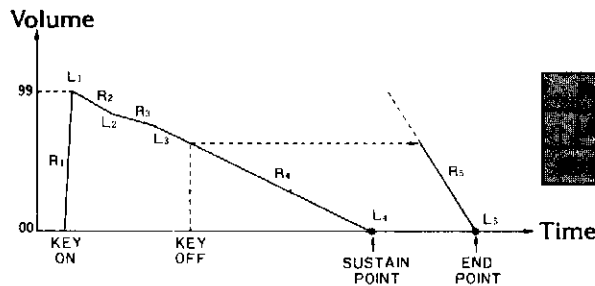
	99	35	20	25	55
	99	80	70	00	00
	•••	•••	•••	SUS	END

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. 11 when the DCA 1 or DCA 2 ENV key is ON.

(Fig. 11)
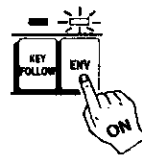
SUS will be displayed here if the displayed STEP is a sustain point. END will be displayed if it is an end point.

Amp envelope STEP 1 is selected.

AMP   STEP1   ***
RATE=m_1m_2 LEVEL=n_1n_2

$\left(\begin{array}{l} 00 \leqq m_1m_2 \leqq 99 \\ 00 \leqq n_1n_2 \leqq 99 \end{array} \right)$

Rate of STEP 1.   Destination level of STEP 1.

Operational procedures are identical to those previously explained for the DCO envelope (page 18). Data is set using the VALUE, CURSOR, ENV STEP and ENV POINT SUSTAIN/END keys.

*   *   *   *   *   *   *

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

■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. 12 when the VIBRATO key is pressed.

(Fig. 12)
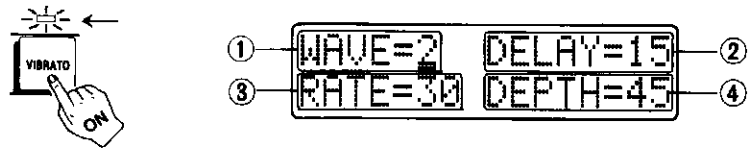
① WAVE is the parameter that selects the vibrato waveform, and is set to a value in the range of 1 through 4 using the VALUE keys. The 4 waveforms are as follows:

Wave 1 .... △▽ TRIANGLE   Wave 3 .... ◣ SAW DOWN

Wave 2 .... ◢ SAW UP   Wave 4 .... ⊓⊔ SWUARE
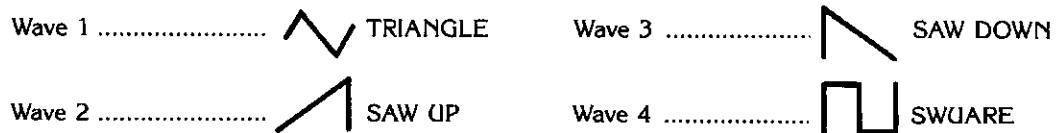
② DELAY is the parameter that sets the time from when a key is pressed until the point at which vibrato is applied. DELAY is set to a value in the range of 0 through 99 using the VALUE keys after the cursor is moved to the proper position with the CURSOR keys. The larger the value, the later vibrato 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 0 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 0 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. 13 when the OCTAVE keys is ON.

(Fig. 13)

OCTAVE
RANGE=+0

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 timbre also include an OCTAVE RANGE setting.

■DETUNE

The pitch between different tones in DCO 1 and DCO 2 can be detuned, the DCO 2 timbre 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. 14 when the DETUNE key is ON. (The cursor is located below the OCT value.)

(Fig. 14)

Determines whether pitch is detuned upward (+) or downward (−).

Pitch is detuned in 1 octave units (1 ~ 3).

```
DETUNE (+) OCT=2
NOTE=03  FINE=48
```

Pitch is detuned in 1/60 halftones.

Pitch is detuned in halftone units (100 cents).
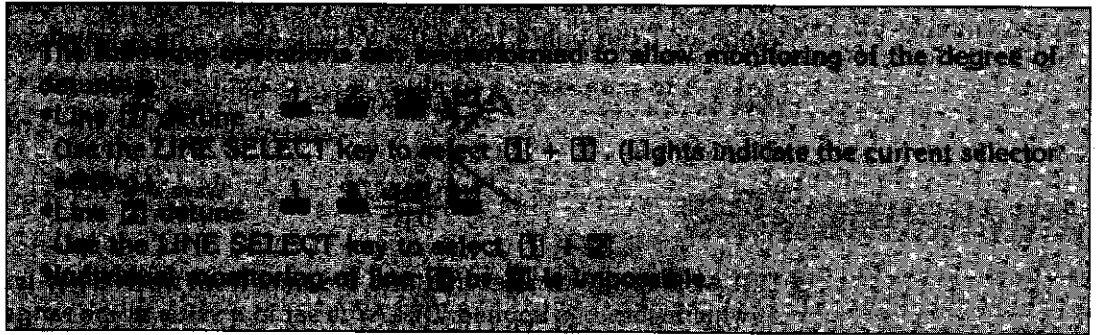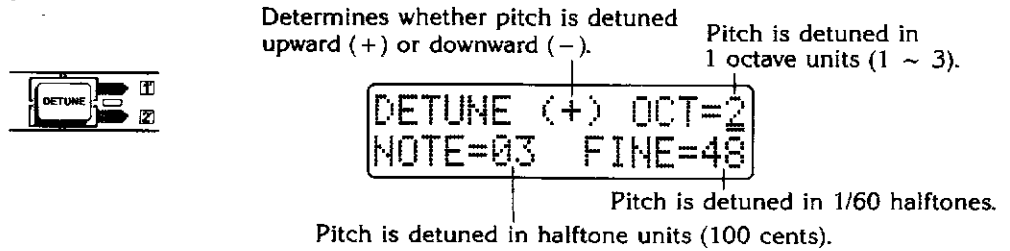
1) Determining the detune direction (up/down)
Use the CURSOR keys to move the cursor under the (+ / −) indicator and the VALUE keys to change between plus and minus. Set to + to raise pitch and to − to lower pitch.

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 timbre also include LINE settings.

The line setting changes in the following order each time the LINE SELECT key is pressed:
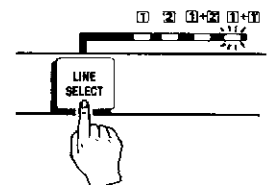
•**Line select** 1
16-note polyphonic for creation of simple sounds.

•**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.

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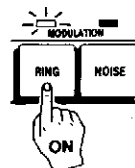
■ NOISE MODULATION
Pressing the NOISE key causes an indicator to light above the key and LINE 1 or LINE 2 output is modulated by noise. Pressing the NOISE key again will turn the function OFF. Noise modulation is only possible when LINE SELECT is set to 1 + 2 or 1 + 1 . Noise modulation is used when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

*The RING and NOISE keys mutually cancel each other.

Extreme settings in the Parameter Section can result in no sound production at all when the range of possible sounds is exceeded.

■ INITIALIZE
This function returns parameters to their initial settings. Press the key that corresponds to the parameter to be initialized while holding the INITIALIZE key down. The LCD will then show the initialized status of the parameter.

(**Example 1**) Initializing the VIBRATO values.

①Press an hold down the INITIALIZE key.　　②Simultaneously press the VIBRATO key.

<LCD>

```
WAVE=1   DELAY=00
RATE=00 DEPTH=00
```

(Example 2) Initializing the values of the DCA 1.

①Press and hold down the INITIALIZE key.　　②Simultaneously press the DCA 1 ENV key.

<LCD>
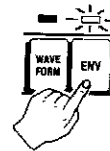
```
AMP   STEP1  SUS
RATE=99 LEVEL=99
```

Original sounds can be created following one of two methods:
1) Selecting one of the 64 timbres in the Programmer Section that is close to the desired sound and modifying it as required.
2) Initializing all parameters and starting from scratch.

The following table shows each parameter's initialized values:

Parameter	Initialized values
VIBRATO	WAVE = 1, DELAY = 00, RATE = 00, DEPTH = 00
OCTAVE	RANGE = 0
WAVE FORM (DCO 1, DCO 2)	FIRST = 1 SECOND = 0

PITCH ENVELOPE (DCO 1, DCO 2)

	STEP 1	STEP 2~7	STEP 8
RATE	50	50	50
LEVEL	00	00	00
ENV POINT	SUS	* * *	END

DCW KEY FOLLOW	RANGE = 0

WAVE ENVELOPE (DCW 1, DCW 2)

	STEP 1	STEP 2~7	STEP 8
RATE	99	50	50
LEVEL	99	00	00
ENV POINT	SUS	* * *	END

DCA KEY FOLLOW	RANGE = 0

AMP ENVELOPE (DCA 1, DCA 2)

	STEP 1	STEP 2~7	STEP 8
RATE	99	50	50
LEVEL	99	00	00
ENV POINT	SUS	* * *	END

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 middle).

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

MEMORY PROTECT FUNCTION

The function protects against inadvertently erasing valuable timbre 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-5000 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.

* The memory protect function does more than just protect data. It is also functional for LOAD operations for sequencer data that has been saved to external memory. Details are given in the SEQUENCER MODE section on page 48. (It should be noted, however, that data SAVE/LOAD operations are performed in the NORMAL mode.)

PROTECT
OFF   ON

Usually left ON.
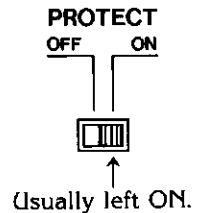
■WRITE

It is said we WRITE altered or newly created timbres when we store them to memory. 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 timbre data from the COMPARE/RECALL area to one of the 32 memory areas of the memory bank.

Before beginning WRITE operations, confirm that the COMPARE/RECALL key is ON.
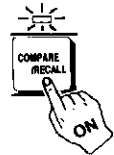
① Set the PROTECT switch on the back panel of the unit to the OFF position.

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

```
PROTECT SWITCH
    * ON *
```

② While holding down the WRITE key, press, in order, the MEMORY BANK key (A ~ D) and then the Voice Selector (1 ~ 8) that corresponds to the area to which the data is to be written.

(Example) WRITE to memory bank D-5

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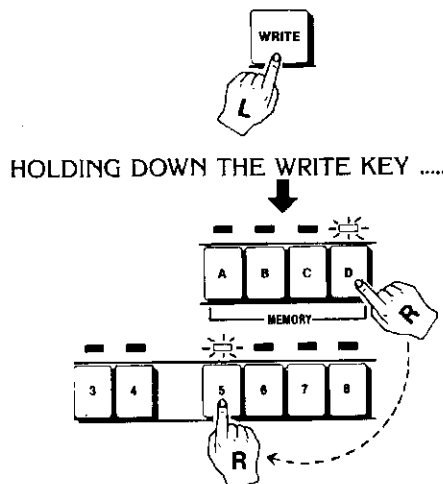
* When the WRITE key is pressed, all indicators in the Programmer Section go out and the following is displayed in the LCD:

```
    WRITE
SELECT MEMORY!
```

* Press first MEMORY bank key D and then Voice Selector 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. MEMORY D-5 will appear on the LCD.

③ Return the PROTECT switch to the ON position.

■SAVE/LOAD

Each WRITE operation requires the deletion of one of the existing 32 timbres stored in memory. This function allows data storage to and retrieval from external memory. SAVE stores the 32 timbres contained in memory to an RA-3 RAM cartridge (option) or a commercially available cassette tape. This clears all 32 memory areas for new timbre data. LOAD is used to recall stored data from external memory.

●RAM CARTRIDGE SAVE/LOAD

Securely insert a RAM cartridge (RA-3, optional) into the cartridge slot located on the back panel.

(Fig. 1)

Cartridge slot
CZ-5000 panel
Label faces up
Connectors
RAM cartridge
(RA-3, optional)
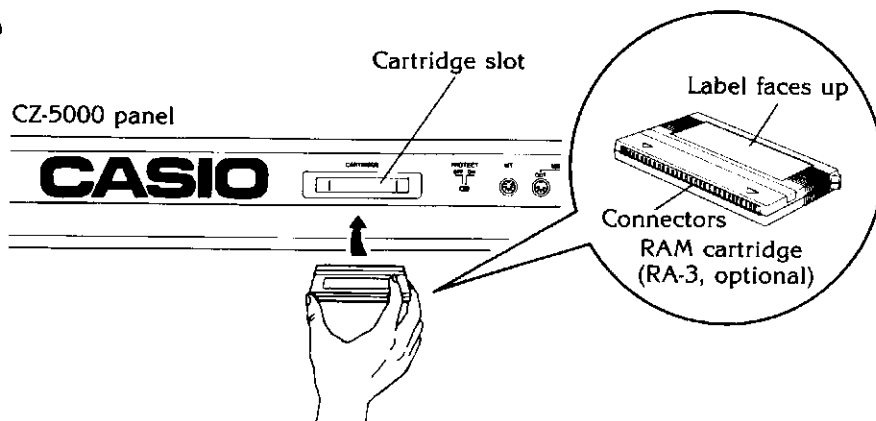
SAVE
① Correctly load a cartridge (see Fig. 1).
② Press the CARTRIDGE key in the SAVE/LOAD Section.

DATA SAVE/LOAD

<LCD>
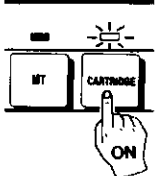
```
CARTRIDGE
SAVE OR LOAD
```

③ Press the SAVE (▼) key in the Data Entry Section.

<LCD>
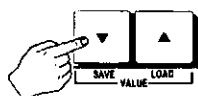

```
SAVE CARTRIDGE
BANK A,B (Y/N)?
```

*Separate SAVE/LOAD operations are performed for A/B (16 timbres) and C/D (16 timbres). Here, the display shows that A/B are ready for SAVE.
To save C/D, first press the NO (◀) key.

<LCD>
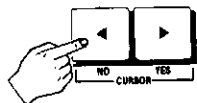
```
SAVE CARTRIDGE
BANK C,D (Y/N)?
```
└── Memory banks C/D selected

④ Actual SAVE operations will begin when the YES (▶) key in the Data Entry Section is pressed.

After banks A/B are saved <LCD>

```
SAVE CARTRIDGE
BANK A,B      OK!
```

After banks C/D are saved

```
SAVE CARTRIDGE
BANK C,D      OK!
```

* SAVE operations are complete when "OK" is displayed.

LOAD

① Correctly load a cartridge (see Fig. 1).
② Set the PROTECT switch located on the rear panel of the unit to the OFF position.
*LOAD cannot be performed and the following will appear on the LCD if the PROTECT switch is left ON.

```
PROTECT SWITCH
   * ON *
```

③ Press the CARTRIDGE key in the Data SAVE/LOAD Section.
④ Press the LOAD (▲) key in the Data Entry Section.
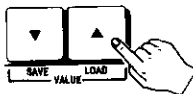
*To load C/D, first press the NO (◀) key.

⑤ Actual LOAD operations will begin when the YES (▶) key in the Data Entry Section is pressed.

Banks A/B LOAD

```
LOAD CARTRIDGE
BANK A,B      OK!
```

Banks C/D LOAD

```
LOAD CARTRIDGE
BANK C,D      OK!
```

*LOAD operations are complete when "OK" is displayed.

*Data passed between the keyboard and RAM cartridge is handled in sets of A/B and C/D. A/B data saved on a cartridge can only be loaded back into memory as A/B.

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

```
SAVE CARTRIDGE
  * ERROR *
```
```
LOAD CARTRIDGE
  * ERROR *
```

If such messages should appear, reinsert the cartridge as far as it will go and reattempt SAVE/LOAD procedures.
● The optional RA-3 RAM cartridges are equipped with a built-in battery (BR-2016) that will preserve contents for approximately 1 year (longer if the RAM cartridge is inserted in the CZ-5000). 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-3 OPERATION MANUAL.)
*RAM contents are erased when the battery is replaced. Load the data from the cartridge to the keyboard before changing the battery.

●CASSETTE TAPE SAVE/LOAD (MT FUNCTION)

A commercially available data recorder or standard tape recorder and a new (unrecorded) cassette tape are required for the following procedure.
As shown in Fig. 2, the recorder is connected to the CZ-5000 using the accessory MT connecting cord.

(Fig. 2)   CZ-5000 rear panel   Data recorder

MT terminal   White Black Red

Accessory MT connecting cord
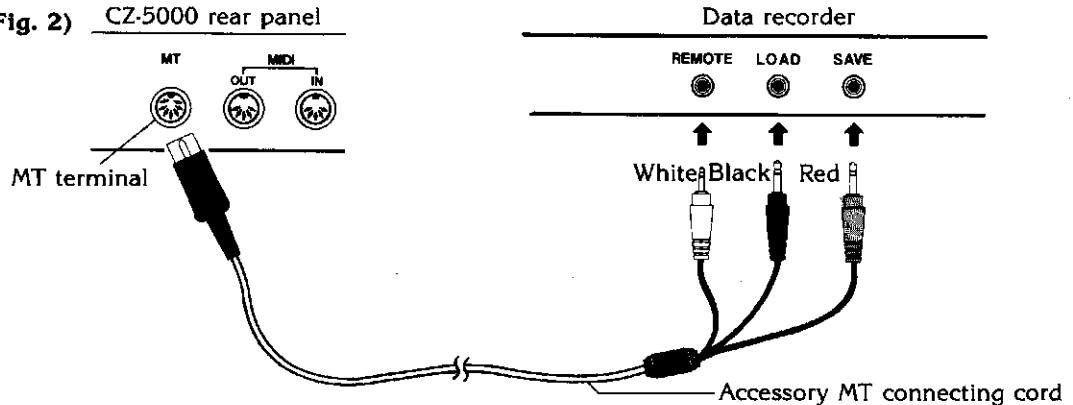
*The RECORDER end of the connecting cord is divided into 3 plugs: white (REMOTE), black (LOAD) and red (SAVE).

CONNECTING THE RECORDER

White: To remote (REM) terminal of recorder.
*Not used for recorders without remote terminals.
Black: To earphone (EAR) or load (LOAD) terminal of recorder.
Red: To microphone (MIC) or save (SAVE) terminal of recorder.

*Actual connections may differ according to the make and/or model of the tape recorder being used. Refer to the respective operation manual for your recorder to ensure proper connections.

SAVE

① Load a cassette tape into the recorder.
*If the tape recorder being used is equipped with a remote terminal, press the RECORD (or SAVE) button of the recorder to put it into its RECORD mode.

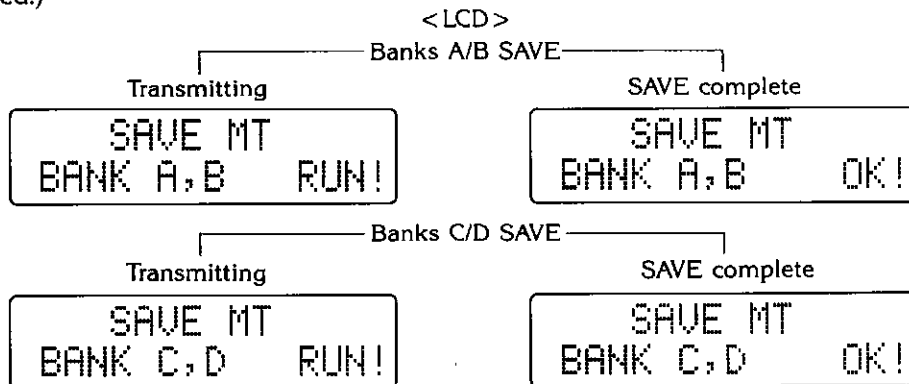② Press the MT key in the Data SAVE/LOAD Section.

DATA SAVE/LOAD

<LCD>

```
       MT
SAVE VERIFY LOAD
```

③ Press the SAVE ([▼]) key in the Data Entry Section.

<LCD>

```
    SAVE MT
BANK A,B (Y/N)?
```

*Separate SAVE/LOAD operations are performed for BANK A/B (16 timbres) and BANK C/D (16 timbres). Here, the display shows that A/B are ready for SAVE. To save C/D, first press the NO ([◄]) key.

<LCD>

```
    SAVE MT
BANK C,D (Y/N)?
```
————— Memory banks C/D selected

Pressing the NO ([◄]) key in the Data Entry Section will cause the data transmission mode to change in the cycle shown below.

NO key — Banks A/B timbre data — NO key

Sequence data ← NO key → Banks C/D timbre data

(See page 47.)

④ Press the YES ([►]) key in the Data Entry Section after performing operations to begin recording for the tape recorder being used. (Approximately 18 to 20 seconds are required.)

<LCD>

┌———— Banks A/B SAVE ————┐

Transmitting   SAVE complete

```
   SAVE MT
BANK A,B    RUN!
```

```
   SAVE MT
BANK A,B      OK!
```

┌———— Banks C/D SAVE ————┐

Transmitting   SAVE complete

```
   SAVE MT
BANK C,D    RUN!
```

```
   SAVE MT
BANK C,D      OK!
```

*SAVE operations are complete when "OK" is displayed. Release the tape recorder from the record mode. (Recorders equipped with a remote terminal automatically stop.)

TIMBRE DATA WRITE/SAVE/LOAD

•30•
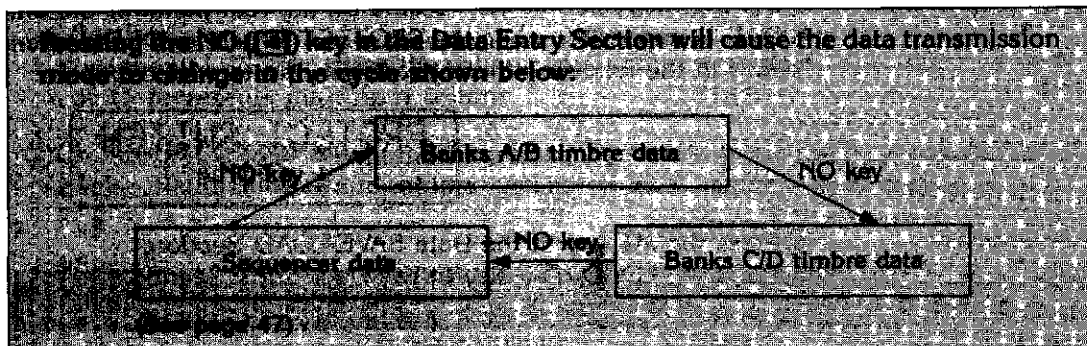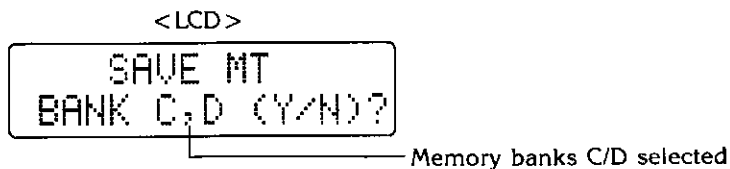
Besides SAVE and LOAD, the MT function also performs VERIFY which confirms that data has been correctly saved. VERIFY should always be performed immediately after SAVE.

①Rewind the cassette tape to a point immediately before the data to be verified.
②Press the MT key in the Data SAVE/LOAD Section.
③Simultaneously press the SAVE and LOAD keys in the Data Entry Section.
   *To verify BANK C/D, first press the NO ([◄]) key.
④Press the YES ([►]) key in the Data Entry Section and then start tape playback. After aproximately 18 or 19 seconds, "OK" will appear if data was saved correctly.

```
  VERIFY MT
BANK A,B    OK!
```

*If "ERROR" appears on the LCD, resave the data.

LOAD

①Load a cassette tape into the recorder.
*If the tape recorder being used is equipped with a remote terminal, press the PLAY (or LOAD) button of the recorder to put it into its PLAYBACK mode.
②Set the PROTECT switch located on the rear panel of the unit to the OFF position.
*LOAD is impossible when the PROTECT switch is ON and attempting to load data will result in the following display (memory protect function).

```
PROTECT SWITCH
    * ON *
```

③Press the MT key in the Data SAVE/LOAD Section.
④Press the LOAD ([▲]) key in the Data Entry Section.
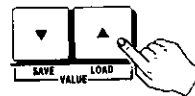
*To load BANK C/D, first press the NO ([◄]) key.

⑤Press the YES ([►]) key in the Data Entry Section after performing operations to begin playback for the tape recorder being used. (Approximately 18 to 20 seconds are required.)

```
  LOAD MT
BANK A,B    RUN!
```

*LOAD operations are complete when "OK" is displayed. Release the tape recorder from the playback mode. (Recorders equipped with a remote terminal automatically stop.)
*Return the PROTECT switch to the ON position after LOAD is complete.

Errors occuring during data transmission will cause the following to be displayed on the LCD (sample shows LOAD error).

```
  LOAD MT
  * ERROR *
```

If this should happen, rewind the tape and restart load procedures from the beginning.
*Data transmission can be cancelled while in operation by pressing the MT key. At this time, an error message will appear on the LCD.

TONE MIX SETTING

With the CZ-5000, two different timbres can be mixed for output. The volumes of the individual timbres that make up a tone mix can be independently controlled. At this time, the keyboard becomes 4-note polyphonic.

① Press the TONE MIX key.
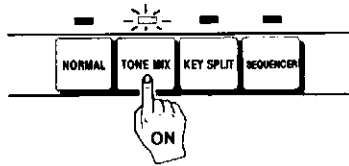
Volume level of TONE 1   Volume level of TONE 2

② 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 timbre and volume level can be changed.

- •Select 1 timbre using the PRESET and MEMORY BANK keys in the Programmer Section.
- •Use the VALUE keys to set the volume level within a range of 1 through 15. A setting of 15 represents maximum volume.

③ Use the ▶ CURSOR key in the Data Entry Section to move the cursor under the LEV 2 value. Set the timbre and volume level in the same manner as that outlined for LEV 1.

EFFECT/OVERALL CONTROL

The Effect and Overall Control Sections operate just as in the NORMAL MODE for tone mixed timbres. Setting procedures are identical, and each function is commonly applied to both of the mixed timbres.

- •PORTAMENTO TIME and ON/OFF
- •GLIDE/NOTE and ON/OFF
- •PITCH BEND and MODULATION DEPTH
- •MASTER TUNE and KEY TRANSPOSE

*With the exception of MODULATION, effect ON/OFF can be independently set in 4 modes: NORMAL, TONE MIX, KEY SPLIT and SEQUENCER. Each effect data (numeric) and modulation ON/OFF are common for 4 modes.
*Monophonic play of the tone mixed data is possible when the SOLO key is ON.

Tone mix settings are stored in memory, so they are not cancelled by changing to another mode and then back to the TONE MIX mode.
*However, though TONE 1 and TONE 2 and the volume level are retained, all effects are turned OFF when the power of the unit is switched OFF.

With the CZ-5000, two timbres 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 timbres can be freely set, and effects can be set to ON and OFF.

KEY SPLIT SETTING

①Press the KEY SPLIT key in the Mode Select Section.

<LCD>

SPLIT POINT = 30
LOWER timbre level (1 ~ 15)
UPPER timbre level (1 ~ 15)
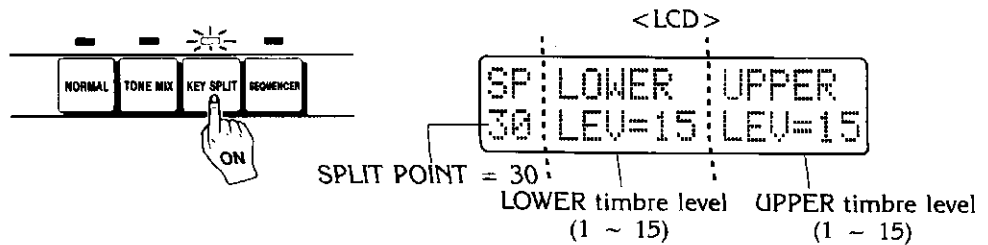
②Use the CURSOR keys to move the cursor to the SPLIT POINT value. Use the VALUE keys to set the value within a range of 1 through 60. This determines the split point.

SPLIT POINT = 30
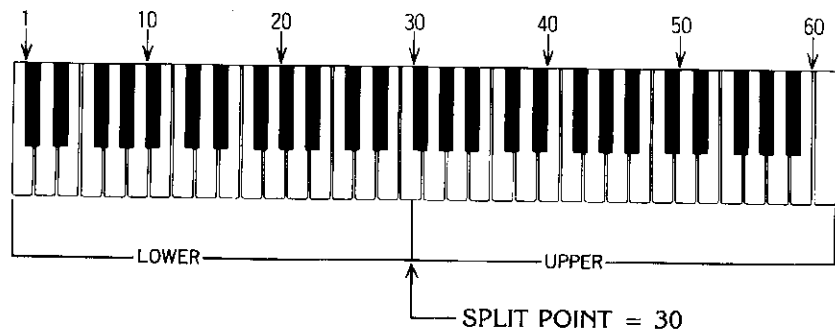
③Use the ▶ CURSOR key to move the cursor to the LOWER LEVEL value. Here, the LOWER timbre and volume level are set.

•Select one of the timbres from the PRESET or MEMORY banks in the Programmer Section. The timbre 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.

④Use the ▶ CURSOR key to move the cursor to the UPPER LEVEL value. Select the timbre and set the volume in the same way as for the LOWER LEVEL.

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

The Effect and Overall Control Sections operated just as in the NORMAL MODE for key split timbres. Setting procedures are identical, but each function is independently set for the UPPER and LOWER timbres.

- PORTAMENTO TIME and ON/OFF
- GLIDE/NOTE and ON/OFF
- PITCH BEND and MODULATION DEPTH
- MASTER TUNE and KEY TRANSPOSE

*PORTAMENTO and GLIDE effects are applied to the timbre at which the cursor is located when the respective control key is pressed.
*SOLO key ON/OFF setting can also be applied independently to the timbres the same as for PORTAMENTO and GLIDE.

★ PART 4 ★ SEQUENCER MODE

(1) 8-TRACK RECORDING

Different timbres can be recorded in each one of the eight tracks. The LINE status (1DCO or 2DCO) does not limit the track that can be recorded.

(2) DUAL RECORDING SYSTEM

Real time and manual recording systems are available. These systems can be used interchangeably.

•REALTIME RECORDING
Records sound just as it is produced on the keyboard, and polyphonic recording is possible in each track. Memory capacity is a total of 3500 notes (if all notes are input in real time).

•MANUAL RECORDING
Notes, values and timbres are all input individually, and monophonic recording is possible in each track. Memory capacity is a total of 7000 notes (if all notes are input manually).

(3) TRACK CHECK FEATURE

This feature allows the modification of timbres and volume level in each track after recording is complete.

(4) UP TO 8-NOTE POLYPHONIC

Basically, when the total POLY VALUE reaches 8, recording becomes impossible in the remaining, empty tracks.

(Example)

Track	POLY value	Recording system
TR. 1	2 POLY	Real time
TR. 2	1 POLY	Manual
TR. 3	1 POLY	Real time
TR. 4	3 POLY	Real time
TR. 5	1 POLY	Manual
TR. 6	×	Recording impossible
TR. 7	×	
TR. 8	×	

Total 8 POLY

Recording POLY total	0	1	2	3	4	5	6	7	8
POLY value available for keyboard play (POLY value available for recording)	8	7	6	5	4	3	2	1	0

(5) POLY VALUE EXPANSION WITH MIDI

For real time recording, the limit on the POLY value is eliminated when an external sound source with a MIDI terminal (MIDI keyboard) is used.

•PLAY

Playback starts when the PLAY key is ON and the play timer (4 digits) on the LCD continually increases by 1 with each beat.

Play timer   Tempo

```
0216        ♩=120
      LOCAL=ON
```
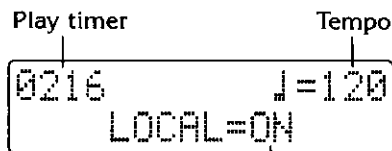
Keep ON unless external sound source is used with MIDI. (See page 53).

•STOP

Suspends playback at any point.

•RESET

Returns to the beginning of the piece and suspends playback. Play timer is reset to 0000.

•FWD

Advances play at high speed (♩ = 256).

•REV

Reverses play at high speed (♩ = 256).

When the FWD or REV key is pressed during playback, playback will be resumed from the point at which the respective key is released. When either key is pressed during suspended play, play will resume the suspended segment at the point at which the respective key is released.

Always lights when stopped, whether at the beginning of the piece or part way through.

•TRACK ON/OFF

The indicators will light above the track selector keys to show which tracks have been recorded. Pressing a track selector key to turn the indicator off will cancel track output whether at the beginning of a selection or part way through.
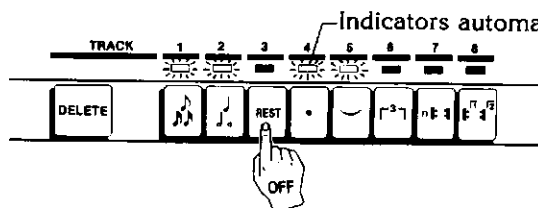
Indicators automatically light to show recorded tracks.

•TEMPO

TEMPO setting can be made at any one of 45 steps within a range of ♩ = 40 through 256. Tempo settings are made using the TEMPO keys, and are displayed on the LCD.

•MINUS ONE PLAY

When the cumulative POLY value of the recorded tracks is less than eight, the remaining number of polyphonics are available for play along with recording playback.

* The Programmer Section and Overall Control Section indicators on the panel of the keyboard show the status of the MINUS ONE PLAY timbre. Timbre changes, GLIDE/PORTAMENTO ON/OFF, pitch bend modulation and the sustain pedal are all applied to the MINUS ONE PLAY timbre and have no effect on the contents of playback.
* The keyboard POLY value is not affected even if recorded track selectors are switched OFF.
* The SOLO function is inoperable during MINUS ONE PLAY. However, the SOLO key will automatically light when the cumulative POLY value of the recorded tracks equals 7.

•OTHER

The following data can be changed when playback is suspended the same as in the NOR-MAL MODE:

(1) Settings that commonly affect sequencer tracks and the keyboard
- PORTAMENTO TIME
- GLIDE NOTE/TIME
- MASTER TUNE and KEY TRANSPOSE
- MIDI

(2) Settings that affect only the keyboard
- BEND RANGE
- MODULATION DEPTH

REAL TIME RECORDING

(1) TRACK SETTING

While pressing and holding down the REAL TIME key, simultaneously press the track selector that corresponds to the track in which you wish to record. The indicator above the track selector pressed will blink.

The LCD will appear as follows when a recording track is selected:

(Fig.1)   Timer   Tempo

```
┌──────────────────────┐
│ 0000-REC    ♩=120 │──③
│ POLY=1      BEAT=4M │──②
└──────────────────────┘
```
①

POLY value   Cursor   Beat (1 — 9) and rhythm volume level (H/M/L/ —)
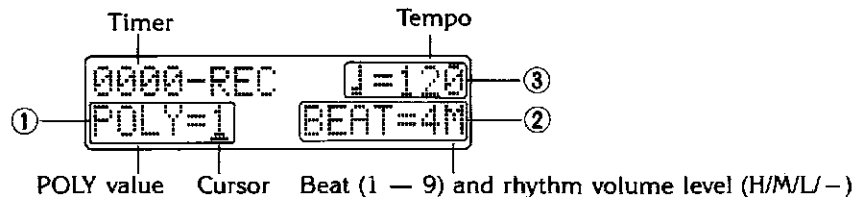
① POLY SETTING

The CURSOR keys are used to move the cursor to the POLY value on the LCD, and the VALUE keys are used to set the record POLY value.
* If other tracks have been recorded, the maximum POLY value will be the number of remaining tones. For examples, if the cumulative recorded POLY value is 3, the next POLY value can be set within a range of 1 through 5.
* The SOLO key will be ON only if POLY=1.

② BEAT SETTING

Use the ▶ CURSOR key to move the cursor to the BEAT value (4 on the previous display). This value indicates the number of beats. Use the VALUE keys to set the number of beats within the range of 1 through 9.
The M to the right of the BEAT value shows the rhythm volume. During real time recording, a rhythm sound is provided for every beat, and the first beat of each measure will be accented. The volume of the rhythm can be set to either H (high), M (medium), L (low) or — (no rhythm).
*A one measure interval (with rhythm) is included at the beginning of a real time recording. This is true even if the volume of the rhythm is set to — (no rhythm).
*No interval is included at the beginning of recording started part way through a piece.

③ TEMPO SETTING

Tempo setting is the same as that for playback (See page 36).

(2) INITIATING RECORDING

Press the RECORD key while a track is in the set status (indicator above a track selector is blinking).

Lit → ☼

→ Recording begins after one measure. (See above).
(Anything played during in this measure is not recorded.)
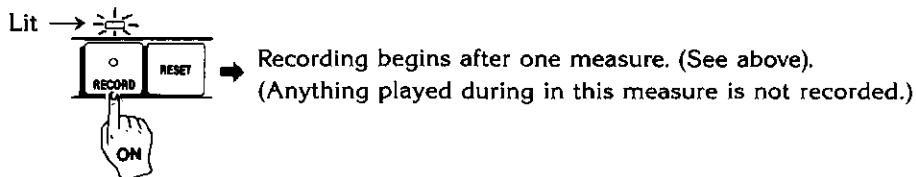
* The follwing data is recorded to the sequencer in real time. These can be changed during recording.
• Keyboard data (note pitch and value)
• Timbre (selected from among the 64 available in the Programmer Section)
• PORTAMENTO/GLIDE ON/OFF
• Sustain pedal ON/OFF

(3) FINISHING RECORDING

Recording can be suspended either by pressing the STOP or RESET key. The STOP key terminates recording without changing the track being recorded, and, if the RECORD key is pressed, recording can be continued from that point. The RESET key cancels the track being recorded, automatically returns to the beginning of the piece and then terminates recording.

Repeating steps (1) through (6) allows real time recording for multiple tracks. New tracks can be added while monitoring the tracks that have already been recorded (indicators above recorded tracks are lit).

(4) ADD ON RECORDING

During real time recording, erroneous data can be corrected using a technique known as "ADD ON" recording. ADD ON recording is performed as follows:

•CORRECTION PART WAY THROUGH A RECORDING
① Press the REV key and return to a point slightly before the part to be corrected.
② Playback will resume from the point at which the REV key is released.
③ Press the proper keys on the keyboard when the portion to be corrected is reached.
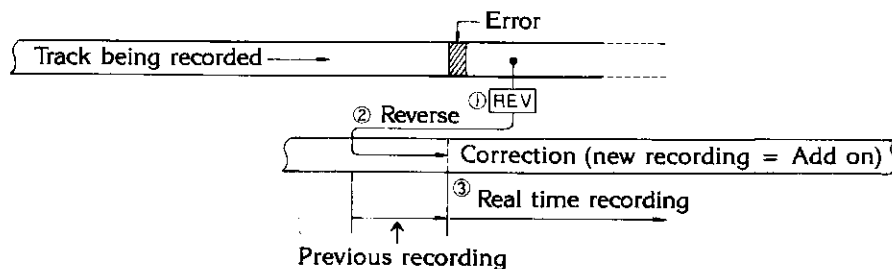
* Besides keyboard operations, selection of a timbre in the Programmer Section, as well as operation of the PORTAMENTO and GLIDE ON/OFF keys resume recording (all subsequent, previously recorded data is erased).
* The indicator above the PLAY key will be lit during ADD ON recording, and the indicator above the RECORD key will automatically light when recording is begun.

•CORRECTION OF A COMPLETED RECORDING
①Specify the track to be changed as the recording track.
②Press the PLAY key to begin playback.
③Press the proper keys on the keyboard when the portion to be corrected is reached.
 (Timbre selection in the Programmer Section and PORTAMENTO/GLIDE ON/OFF operation are also possible.)
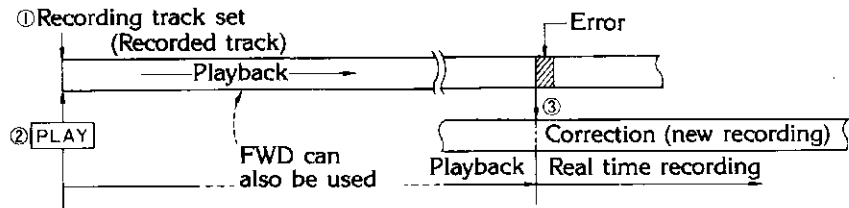
•CORRECTION DURING PLAYBACK
①Press the STOP key to suspend playback.
②Specify the track to be changed as the recording track.
③Press the PLAY key to begin playback from the point originally suspended.
④Advance to the point to be corrected using the FWD or REV key and press the proper keys on the keyboard. (Timbre selection in the Programmer Section and PORTAMENTO/GLIDE ON/OFF operation are also possible.)
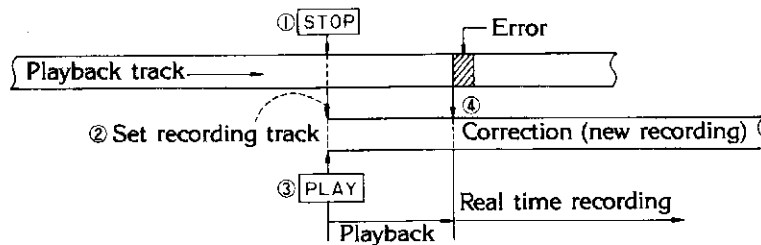
* The following appears on the LCD when a completed track is rerecorded during playback:
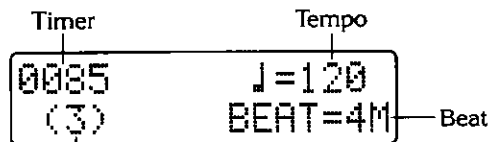
(3) indicates that the previous POLY value of the current track was 3.
(It is necessary to delete the entire track to reset the POLY value.)

(1) TRACK SETTING
While pressing and holding down the MANUAL key, simultaneously press the track selector that corresponds to the track in which you wish to record.
The indicator above the track selector pressed will blink.

* Track selection can only be performed when playback is stopped.

The LCD will appear as follows when a recording track is selected:

POLY value is not displayed in manual recording (always monophonic).

(2) INITIATING MANUAL RECORDING

①Select a timbre in the programmer section.

Ex.) When A-1 (BRASS ENS.1) is selected

<LCD>

Step   PORTAMENTO OFF

```
┌─────────────────────────┐
│ 001        'PST' P=0     │
│          ,A-1, G=0       │
└─────────────────────────┘
```

Data included in [ ] is input ────── GLIDE OFF
1 step at a time.   PST = preset. MEM is displayed
              when MEMORY voice is selected.
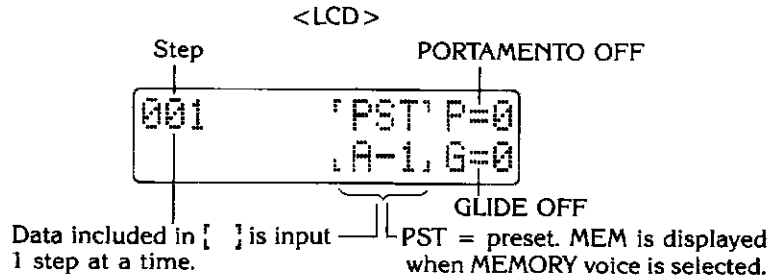
* [ ] denote the data input region.

②To turn either portamento or glide ON, press the FWD key to advance one step.
[ ] will be displayed at the P (portamento) and G (glide) data. (See below.)

Each press advances manual recording data 1 step.

```
┌─────────────────────────┐
│ 002 PST  'P=1'    ‖      │
│     A-1 ,G=0,            │
└─────────────────────────┘
```

P (portamento) and G (glide) data can be input.

Overall Control Section

┌ON/OFF┐

PORTA-MENTO   GLIDE

→

'P=0'
,G=0, ······· Both portamento and glide are OFF

'P=1'
,G=0, ······· Poratmento ON

'P=0'
,G=1, ······· Glide ON

Mutually cancel each other

---
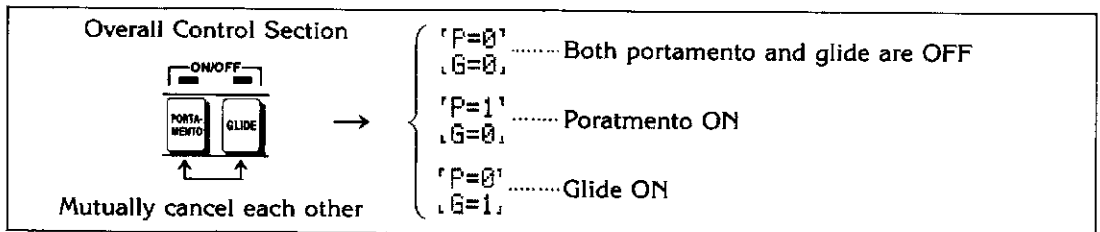
③ Press the FWD key to advance to the next step, and now it's time to input actual notes.

```
┌─────────────────────────┐
│ 003 P=1  '       '  ‖    │
│     G=0  L   ↑   J       │
└─────────────────────────┘
```
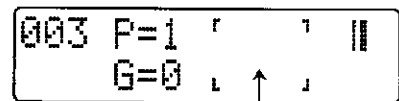
Data input begins

(3) NOTE AND REST INPUT (BASIC OPERATION)

Basically, input is performed using the manual data keys (combined with the track selectors) to input the values of notes (or rests). Then pitch is input using the keyboard keys and rests are input with the REST key.

                  Dot   Tie
               Rest | | Triplet
Note/rest values ─────┐ ↓   ↓   ↓   ↓ ┌─── Repeat symbols

```
┌──┬──┬────┬─┬─┬───┬────┬─────┐
│♪ │♩.│REST│ •│─│⌐³¬│⌐³¬ │⌐³¬⌐³¬│  ←
└──┴──┴────┴─┴─┴───┴────┴─────┘
```

└──── Manual data keys ────┘
(track selectors)

·40·
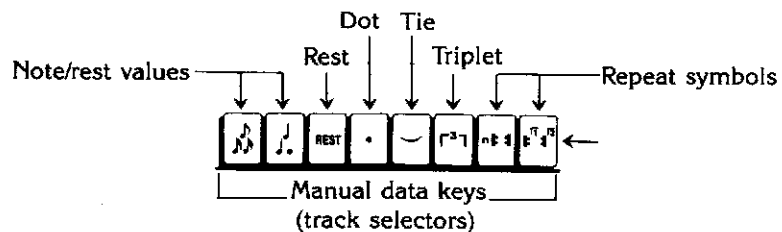
① SETTING NOTE/REST VALUES

•Setting ♪ , ♪ , ♪

                                         \<LCD\>

🎵 Press key once   🎵 Press key twice   🎵 Press key three times
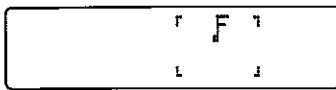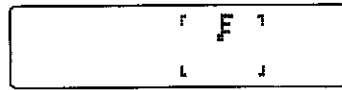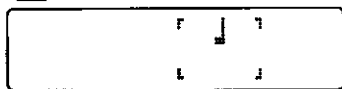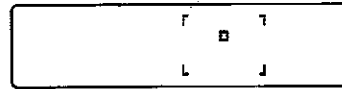
After three times ♪ → ♪ → ♪ repeats

•Setting ♩ , ♩ , o

🎵 Press key once   🎵 Press key twice   🎵 Press key three times

After three times ♩ → ♩ → o repeats

•SETTING DOTS

After setting the value of a note/rest as outlined above, pressing the [•] key adds a dot to the note. Pressing this key again remove the dot.

* Dot cannot be added to 32nd notes.

(Example)   \<LCD\>

       (8th note)   (dotted 8th note)

② PITCH/REST SETTING

•PITCH SETTING

After setting the value of a note, press a key on the keyboard to input the pitch. (Input is complete when the keyboard key is released.) The step will automatically advance when a pitch is input. At this time, its value is retained in memory in the next step.

(Example)   A4 (LA)
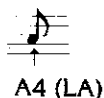
The value (only) of any note input is retained in memory. Therefore, successive notes of the same value such as ♫♫ can be input by simply pressing keys on the keyboard after the value of the first note is input.

•REST SETTING

Pressing the REST key instead of a key on the keyboard will input a rest of the same value as the previously input note. Pressing the REST key also automatically advances the step. At this time the value of the rest is retained in memory in the next step. (See following illustration)

(Example)   Setting the value.   Press the [REST] key.
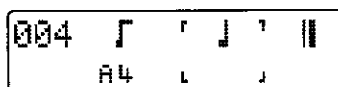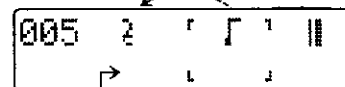
Quarter rest   No display here for rest.

③ TRIPLET SETTING

The ⌐₃⌐ key is pressed after inputting the value of a note using the ♫ , ♩ ,or • key to input a triplet. Pressing the key again will cancel the triplet.

(Example)
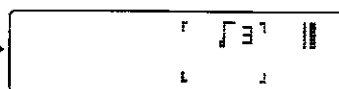
Press the ♫ key. → **Press the ⌐₃⌐ key.** → **Input C4 on the keyboard**
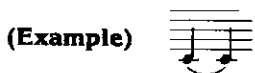
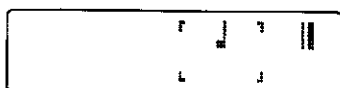**Input D4 on the keyboard.** → **Input E4 on the keyboard.**
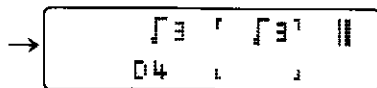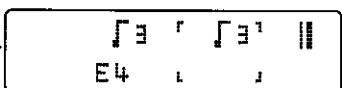
The above procedure inputs a "DO-RE-MI" triplet.

④ TIE INPUT

Ties are input using the ⊟ key.

(Example)

Press the ♩ key. → **Input C4 on the keyboard.** → **Press the ⊟ .**
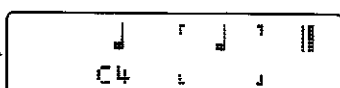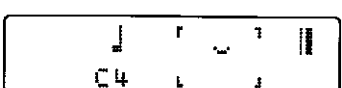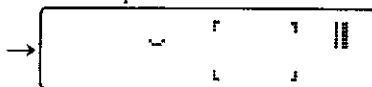
Press the FWD key to advance the step. → **Press the ♩ key and input C4 on the keyboard.**
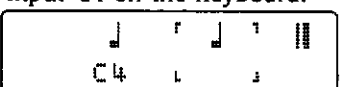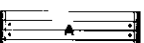
⑤ REPEAT SYMBOL INPUT

The ⦂⦙ 🔁 keys are used for repeat play of part or all of a piece.

The ⦂⦙ key is used to repeat the A data in [___A___] n number of times.

As many times as this key is pressed, the A data will be repeated. The maximum setting is n = 8, and n = 9 results in an endless repeat. N = 10 is the same as n = 1.
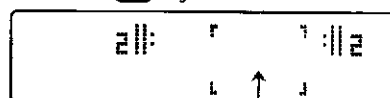
The 🔁 symbol is used to input [A───B───C] and results in play of A → B → A → C.

(Example 1) Playing [:___A___:] twice.
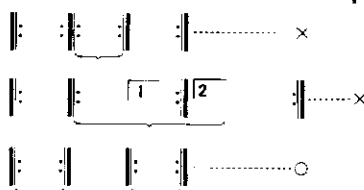
Press the ⦂⦙ key twice. → **Press the FWD key to advance the step.**
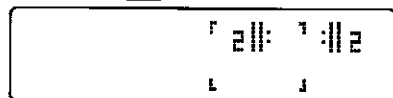
During this display, input the data that are to be played between the repeat symbols.
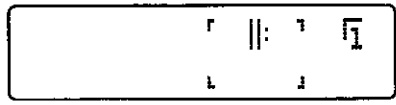
After a repeat section is complete, pressing the FWD key will result in :‖₂ being displayed. Therefore, two steps must be advanced before input following a repeat section.

*A repeat symbol cannot be used between two other repeat symbols.
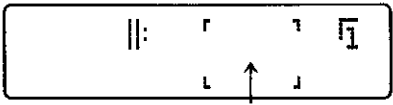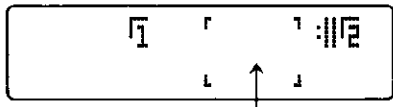
·42·

(Example 2)

Press the ▣ key.

Press the ⟦FWD⟧ key to advance the step.
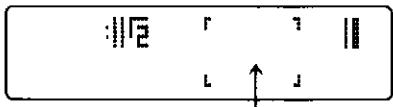
During this display, input the data that are to be played in A.

Press the ⟦FWD⟧ key twice (advance two steps) after completing input of data A.

During this display, input the data B.

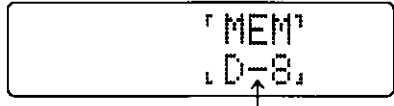Press the ⟦FWD⟧ key twice (advance two steps) after completing input of data B.

During this display, input the data C that are to be played after the repetition of A and B.

⑥ CHANGING TIMBRE

Timbre can be changed at any time during manual recording. Select the timbre in the Programmer Section at the point the change is to take place.

(Example)
Setting memory voice D-8

⌈ MEM ⌉
⌊ D-8 ⌋

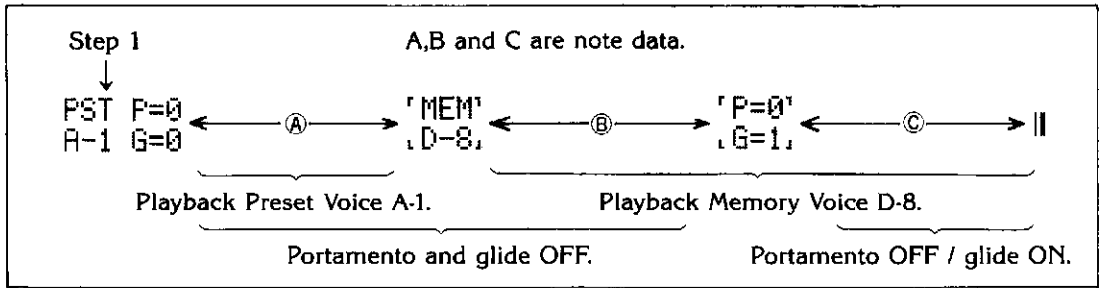Input data after advancing the step with the FWD key.

⑦ CHANGING PORTAMENTO/GLIDE ON/OFF

Portamento and glide ON/OFF can be changed at any time during manual recording. The PORTAMENTO ON/OFF key and GLIDE ON/OFF key in the Overall Control Section are used for input.

(Example)

⌈ P=0 ⌉
⌊ G=1 ⌋

Input data after advancing the step with the ⟦FWD⟧ key.

Step 1

A,B and C are note data.

PST P=0 ←—Ⓐ—→ ⌈MEM⌉ ←—Ⓑ—→ ⌈P=0⌉ ←—Ⓒ—→ ‖
A-1 G=0   ⌊D-8⌋   ⌊G=1⌋

Playback Preset Voice A-1.   Playback Memory Voice D-8.

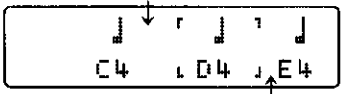Portamento and glide OFF.   Portamento OFF / glide ON.

⑧ INSERTING DATA

Data insert during manual recording can be performed using the REV and FWD keys.

(Example)
① Data inserted between C4 and D4
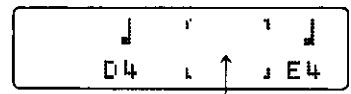
Press the ⟦REV⟧ key for ①.

Press the ⟦FWD⟧ key for ②.

C4 ⌊D4⌋ E4

② Data inserted between D4 and E4

C4   D4
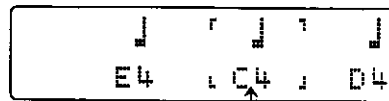Data input

D4   E4
Data input

⑨ DELETING DATA

(1) DELETING ONE PIECE OF DATA

Use the REV and FWD keys to move the [ ] to the data to be deleted, and press the DELETE key.
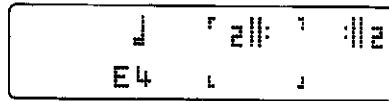
(Example 1)

Press the [DELETE] key.

Data to be deleted.
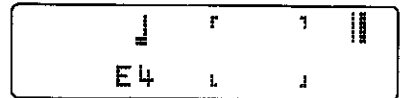
(Example 2)

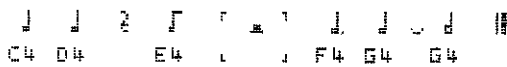Press the [DELETE] key.

Repeat symbol to be deleted.

* Repeat symbols between which data are present cannot be deleted.

(2) DELETING GROUPS OF DATA

Use the REV and FWD keys to move the [ ] to the beginning of the data to be deleted. Press the track selector that corresponds to the track that holds the data to be deleted while holding down the DELETE key. All data following the data shown in the [ ] will be deleted.

(Example 1) Deleting TRACK 2 during manual recording

Hold down the DELETE key.
Simultaneously press the <track 2> key.
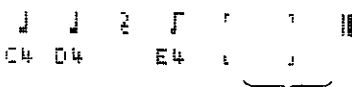
All data following this point will be deleted.

(Example 2) Repeat symbols
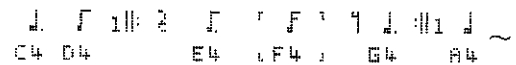
Hold down the DELETE key.
Simultaneously press the <track 2> key.
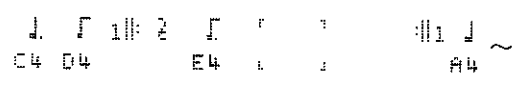
Deleted

(4) COMPLETING MANUAL RECORDING

Press the RESET key when data input is complete.

TRACK CHECK

The track check function allows modifications in the data timbre, portamento/glide ON/OFF and volume level after real time or manual recording is complete. Track check can be performed independently on each recorded track.

(Example)

Play direction ──────►		
Timbre	PST A-1	MEM C-1
Portamento ON/OFF	ON	OFF
Glide ON/OFF	OFF	ON
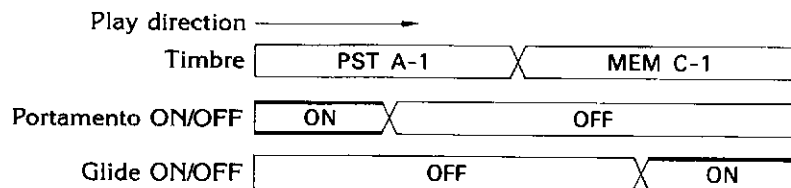
The following can be accomplished with track check on the piece illustrated above:

• Change the section recorded using preset voice A—1 to a different timbre. Change the section recorded using memory voice C—1 to a different timbre.
• Set the volume levels of the timbre sections to a value within the range of 01 through 15. (Initial value after recording is 15.)
• Turn portamento OFF where ON and vice versa.
• Turn glide OFF where ON and vice versa.

•INSTITUTING TRACK CHECK

① Playback to the point to be changed and press the STOP key.

② Press the TRACK CHECK key.
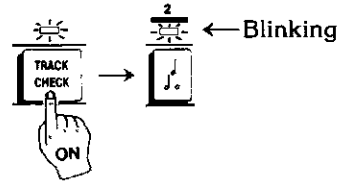
←Blinking

* The indicator blinks above the key that corresponds to the previously checked track (TRACK 1 for the first check).
*The timbre and portamento/glide ON/OFF status are shown for the track indicated by the blinking indicator on the keyboard panel. The keyboard can be operated to confirm settings.
* The LCD shows the volume level.

```
TRACK2 CHECK
    LEV=12
```
TRACK 2 volume level

③ Press the track selector with the blinking indicator to change data in that track.
④ Confirming the output with the keyboard, it is possible to change the timbre with the Programmer Section, and set the volume level with the VALUE 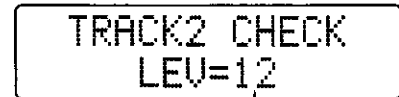keys. Also use the POR-TAMENTO/GLIDE ON/OFF keys in the Overall Control Section to change the respective settings to ON and OFF.
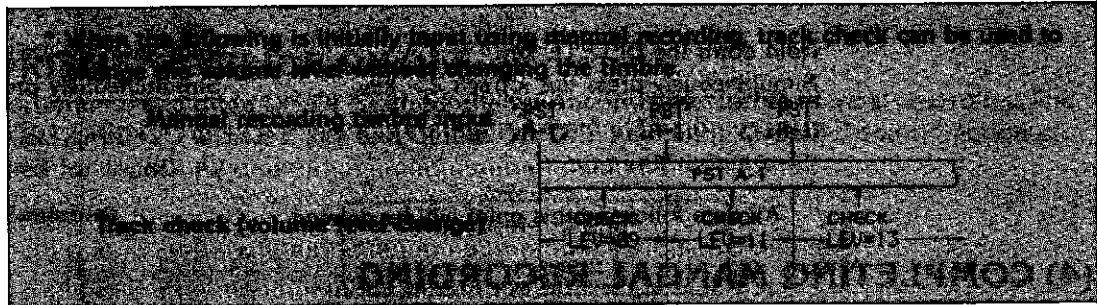
•TERMINATING TRACK CHECK

Pressing the RESET key terminates track check operations. Playback in accordance with the new settings starts from the beginning of the piece when the PLAY key is pressed.

*The following appears on the LCD when an attempt is made to track check an empty (unrecorded) track:

```
TRACK8 CHECK
   EMPTY!
```

At this time, choose a track selector that contains data.

•CLEARING RECORDED DATA

[SPECIFIC TRACK]

① Press the RESET key.
② Press the track selector that corresponds to the track to be cleared while simultaneously holding down the DELETE key.
*Continue depressing the DELETE key and press other track selectors to clear multiple tracks.

[PART OF A REAL TIME RECORDED TRACK]

① Press the PLAY key followed by the STOP key when the point to be cleared is reached.

② Set real time recording.

③ Press the RECORD key followed by the RESET key. Everything from the position selected with the STOP key will be deleted.

See page 44 for partial clearing of a manual recording.

•REMAINING MEMORY CAPACITY DISPLAY

Memory capacity can be confirmed under the following operation.

Press the REAL TIME or MANUAL key after the RESET or STOP key has been pressed. This operation will cause the following to appear on the LCD:

Display while REALTIME or MANUAL key is depressed.

```
MEMORY
     75% AVAILABLE
```

75% of the memory is still available for data storage.

•MEMORY OVER

Memory over results when the sequencer memory is fully used during recording. Further recording will be impossible.

In this case, press the RESET key.

<LCD>

```
*MEMORY OVER*
PUSH RESET KEY
```

Memory over display

•DCO FULL

DCO full results when an attempt is made to specify an empty (unrecorded) track as the recording track when the cumulative POLY value total equals 8. Further recording will be impossible.

<LCD>

```
*DCO FULL*
PUSH RESET KEY
```

DCO FULL display

•REPEAT PLAYBACK

Pressing the REPEAT key at the beginning of a piece or during playback will result in endless playback.

* A one measure rest is included between the end of the piece and playback from the beginning.

•LOCAL ON/OFF

The LOCAL = ON (OFF) display on the LCD during playback or when playback is suspended is explained in the next chapter on MIDI. Keep the setting to ON when using a single CZ-5000 unit. If the setting should change to OFF, reset to ON using the RESET key.

Data recorded with the sequencer can be saved to a cassette tape and later reloaded when required (MT function).

See the instruction on page 45 for proper connection of the cassette tape recorder. SAVE, VERIFY and LOAD operations are similar to those used for timbre data.

SAVE
① Load a cassette tape into the recorder.
* If the tape being used is equipped with a remote terminal, press the RECORD (or SAVE) button of the recorder to put it into its RECORD mode.

② Press the MT key in the Data SAVE/ LOAD Section.

<LCD>
```
        MT
SAVE VERIFY LOAD
```
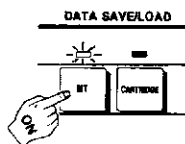
③ Press the SAVE ▼ key in the Data Entry Section.

<LCD>
```
  SAVE MT
BANK A,B (Y/N)?
```

④ Press the NO (◀) key in the Data Entry Section TWICE.
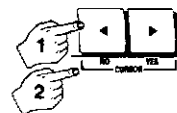
```
   SAVE MT
SEQUENCER (Y,N)?
```
Sequencer data selected

⑤ Press the YES (▶) key in the Data Entry Section immediately after performing operations to begin recording for the tape recorde being used.
(Approximately 1 minute and 28 seconds will be required for data that uses 100% of the sequencer memory.)

*Pressing the YES key will automatically begin recording and SAVE operations with recorders equipped with a remote terminal.

<LCD>
```
   SAVE MT
SEQUENCER   RUN!
```
Transmitting

* SAVE operations are complete when "OK" is displayed. Release the tape recorder from the record mode.
(Recorders equipped with a remote terminal automatically stop.)

VERIFY
VERIFY confirms that data has been correctly saved and should always be performed immediately after SAVE.
① Rewind the cassette tape to a point immediately before the data to be verified.

② Simultaneously press the SAVE and LOAD keys in the Data Entry Section.

③ Press the NO key in the Data SAVE/LOAD Section twice.

④ Press the YES key in the Data Entry Section and then start tape playback. "OK" will appear if data was saved correctly.

```
  VERIFY MT
SEQUENCER (Y/N)?
```

* If "ERROR" appears on the LCD, resave the data.

LOAD

① Load a cassette tape into the recorder.
* If the tape recorder being used is equipped with a remote terminal, press the PLAY (or LOAD) button of the recorder to put it into its PLAYBACK mode.

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

*LOAD is impossible when the PROTECT switch is ON and attempting to load data will result in the following display (memory protect function).

```
┌─────────────────────────┐
│  PROTECT SWITCH         │
│      * ON *             │
└─────────────────────────┘
```

③ Press the MT key in the Data SAVE/LOAD Section.

④ Press the load (VALUE ▲) key in the Data Entry Section.

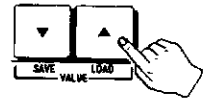Subsequent operations are identical to steps 4 and 5 in the SAVE procedures.

⑤ Press the NO key in the Data Entry Section TWICE.

⑥ Press the YES key in the Data Entry Section immediately after performing operations to begin playback for the tape recorder being used.

*Pressing the YES key will automatically begin LOAD operations with recorders equipped with a remote terminal.

<LCD>
```
┌─────────────────────────┐
│  LOAD MT                │
│ SEQUENCER      RUN !     │
└─────────────────────────┘
```
Transmitting

*LOAD operations are complete when "OK" is displayed. Release the tape recorder from the playback record mode. (Recorders equipped with a remote terminal automatically stop.)
*Return the PROTECT switch to the ON position after LOAD is complete.
*If "ERROR" appears on the LCD, resave the data.

Errors occuring during data transmission will cause the following to be displayed on the LCD (sample shows LOAD error).

```
┌─────────────────────────┐
│  LOAD MT                │
│     * ERROR *           │
└─────────────────────────┘
```

If this should happen, rewind the tape and restart load procedures from the beginning.
* Data transmission can be cancelled while in operation by pressing the MT key. At this time, an error message will appear on the LCD.

MIDI (MUSICAL INSTRUMENT DIGITAL INTERFACE) is a standard interface that allows the connection of two electronic musical instruments. The CZ-5000 is capable of transmitting the following data:

SEND/RECEIVE DATA

Function	NORMAL		TONE MIX		KEY SPLIT		SEQUENCER	
	Send	Receive	Send	Receive	Send	Receive	Send	Receive
Key pitch ON/OFF data	○	○	○	○	○	○	○	
MODULATION WHEEL data	○	○	○	○	○	○	○	
PORTAMENTO TIME		○		○		○		○
MASTER TUNE		○		○		○		○
PORTAMENTO ON/OFF	○	○	○	○	○	○	○	
SUSTAIN PEDAL ON/OFF	○	○	○	○	○	○	○	
Timbre number data	○	○	○	○	○	○	○	
PITCH BEND data	○	○	○	○	○	○	○	
LOCAL CONTROL OFF	○	○		○		○		
END OF SYSTEM EXCLUSIVE		○	○	○	○	○	○	○
TIMING CLOCK							○	○
START							○	○
CONTINUE START							○	○
STOP							○	○

SYSTEM EXCLUSIVE MESSAGE TABLE

Message	NORMAL		TONE MIX		KEY SPLIT		SEQUENCER	
	Send	Receive	Send	Receive	Send	Receive	Send	Receive
(1) SEND REQUEST 1		○						
(2) RECEIVE REQUEST 1		○						
(3) SYNTHESIZER		○	○	○	○			
(4) KEY TRANSPOSE		○	○	○	○			
(5) NOTE		○	○	○	○			
(6)		○	○	○	○			
(7) MODULATION DEPTH		○	○	○	○			
(8) LEVEL		○	○	○	○			
(9) GLIDE ON/OFF	○	○	○	○	○	○	○	
(10) SEND REQUEST 2		○						
(11) RECEIVE REQUEST 2		○						

•NORMAL MODE

The following appears on the LCD when the MIDI key is pressed in the NORMAL MODE:

```
①─┤P.MODE    KBCH=01├─②
③─┤CH=01      PRG=ENA├─④
```

① P.MODE
Polyphonic mode, indicates polyphonic data interchange capabilities.
② KBCH = 01 (Send channel)
Indicates that Channel 1 is the send channel. The CURSOR keys are used to move the cursor to KBCH and the channel is set within a range of 01 through 16 using the VALUE keys in the Data Entry Section.
③ CH = 01 (Receive channel)
Indicates that Channel 1 is the receive channel. The Cursor keys are used to move the cursor to CH and the channel is set within a range of 01 through 16 using the VALUE keys in the Data Entry Section.
④ PRG = ENA (Timbre data interchange enable)
Indicates that it is possible to exchange timbre data.

SEND CHANNEL AND RECEIVE CHANNEL

When the keyboard is connected to another MIDI keyboard or a rhythm box, one end becomes signal send and the other signal receive. Correct interchange of data is impossible unless the two channels match. This is similar to having to tune in a radio or television to match the transmission frequency from the broadcasting station. Generally, if the send channel is 1, the receive channel must also be 1.

```
⑤─┤M.MODE    KBCH=01│
⑥─┤CH=01(1)  PRG=DIS├─⑦
```

⑤ M.MODE
Pressing one of the VALUE keys in the Data Entry Section when the cursor is under the mode causes the LCD to change as shown here. This display indicates the monophonic mode which means that monophonic data interchange is possible.

⑥ CH = 01 (1) (Basic channel and voice channel setting)
Indicates the receive channel in the mono mode setting. The first value shows the basic channel while the value in parentheses indicates the number of voice channels.

⑦ PRG = DIS (Timbre data interchange disable)
Indicates that it is impossible to exchange timbre data. This setting changes from DIS to ENA and back again with each press of a VALUE key when the cursor is in this position.

POLY MODE AND MONO MODE

In the poly mode, the CZ-5000 is capable of exchanging polyphonic data . As previously mentioned, the send and receive channels must match at this time.

In the mono mode, the CZ-5000 can act as a monophonic synthesizer, able to receive and play independent timbres in each channel.

Using the CURSOR and VALUE keys to change the settings in Fig. 6 to CH = 01 (8) results in 8 voice channels starting with basic channel 1.

Simularly, in the case of CH = 03 (3), channels 3, 4 and 5 are each equivalent to monophonic synthesizers. At this time, the remaining sound sources (8 − 3 = 5) can be used for keyboard play.

The timbre from 2 DCO (selecting 1 + 2' or 1 + 1' with the LINE SELECT key) results in 5-note polyphonic, while 1 DCO (selecting 1 or 2) results in 10-note polyphonic.

Since all sound sources are used as MIDI channels when the voice channel setting is 8, the keyboard becomes inoperable.

The lamps that are lit on the console of the CZ-5000 do not indicate data received through the MIDI. They show the status of CZ-5000 timbres and effects.

MIDI data →→→ [ ] } 3 monophonic synthesizers

[ ] } Remaining sound sources (5 or 10 polyphonic)
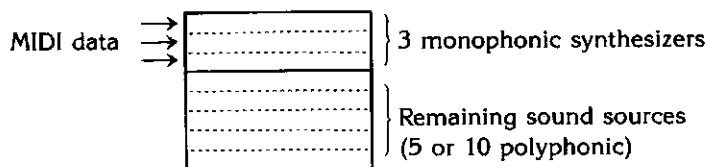
PRG ENA AND PRG DIS

It is sometimes desireable to keep the timbre of one of the two connected musical instruments fixed. The example here will use two CZ-5000s.

OUT ⓐ PRG = ENA   IN ⓑ PRG = DIS
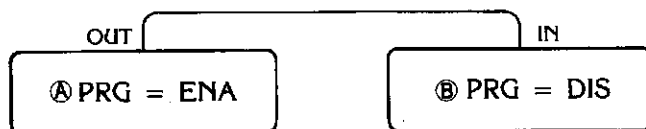
In this example, the timbres of unit ⓑ are fixed and are unaffected when timbres in unit ⓐ are changed. If unit ⓑ were set to PRG = ENA, changes of unit ⓐ timbres would result in corresponding changes in unit ⓑ .

•TONE MIX AND KEY SPLIT MODE

The following appears on the LCD when the MIDI key is pressed in the TONE MIX or KEY SPLIT mode:

```
P.MODE    KBCH=01
CH=01     PRG=ENA
```

In this case, data exchange is only possible in the poly mode, and the mono mode cannot be specified. (The cursor will not move to the P.MODE position.)

Settings for the send channel (KBGH), receive channel (CH) and timbre exchange able/disable (PRG = ENA/DIS) mode are made in the same manner as those for the NORMAL mode (see page 50).

*When timbre change data or volume level change data is received from an external source in the TONE MIX or KEY SPLIT mode, the indicators on the CZ-5000 change for the settings corresponding to the position of the cursor.

•SEQUENCER MODE

The indicators shown to the right appear on the LCD when the MIDI key is pressed in the SEQUENCER mode:

①——| CLK=INT   KBCH=01 |——②
③——| CH=01   PRG=ENA |——④
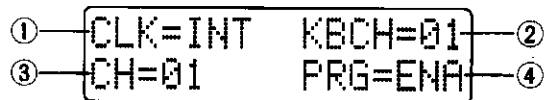
① CLK = INT (Clock)

Indicates the status of the clock. Pressing the VALUE keys when the cursor is this position changes the setting to CLK = EXT.

CLOCK STATUS

Both instruments connected with a MIDI cable exchange synchronous signals.

CLK = INT

In this case, the CZ-5000 controls the connected MIDI keyboard or rhythm box. (The CZ-5000 is the host and the connected device is the slave.)

CLK = EXT

In this case, the connected MIDI keyboard or rhythn box controls the CZ-5000. (The connected device is the host and the CZ-5000 is the slave.)

* Recording to the sequencer is impossible in this status.

Settings for the send channel ② (KBCH), receive channel ③ (CH) and timbre exchange able/disable ④ (PRG = ENA/DIS) are made in the same manner as those for the NORMAL mode (see page 50).

SEQUENCER MODE APPLICATION EXAMPLES

I. Using the keyboard of the CZ-5000 with an external sound source during sequencer playback.
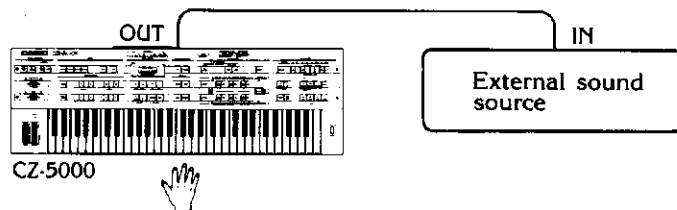
① Match the send channel (KBCH) or the CZ-5000 with the receive channel of the external sound source.

② Set LOCAL = OFF to allow the keyboard to sound the external sound source only.

| 0000   ♩=160 |
| LOCAL=ON |

Pressing the SEQUENCER key will cause the display shown above to appear on the LCD. The display will change to LOCAL = OFF when the VALUE keys are pressed.

```
        OUT [                     ]  IN
   [              ]      [                    ]
   [   CZ-5000    ]      [  External sound    ]
   [              ]      [  source            ]
```

Set LOCAL = OFF when it is desireable to eliminate sound from the CZ-5000 when it is being used to drive an external sound source. (For example, when 7 POLY is used for the sequencer making the keyboard monophonic, and another keyboard is used to play along.)
Conversely, set LOCAL = ON to allow sound to come from both the CZ-5000 and the external sound source.Pressing the RESET key will return theCZ-5000 to LOCAL = ON from LOCAL = OFF.

II. Using an external sound source to play the sequencer of the CZ-5000.

Data recorded in the sequencer of the CZ-5000 can be played back using a MIDI standard keyboard as an external sound source.

Match the receive channel of the external sound source with the track number to be played.

Track 1. Bass

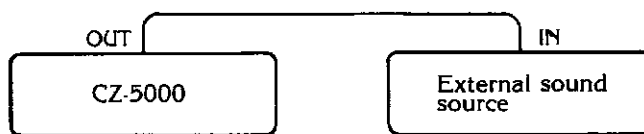| Track 2. Chord | Track to be played back on external sound source.

Track 3. Melody
⋮

In this case, set the external sound source receive channel to 2.

*To send only specific tracks to the external sound source for playback without sound from the CZ-5000, press the corresponding Track selector. This will cause only the specified track data to be sent to the external sound source.

III. Using an external sound source for real time recording with the CZ-5000 sequencer.

The recording/playback POLY value of the CZ-5000 can be increased by the POLY value of the connected sound source (real time recording only).

①Match the receive of the external sound source with the channel to be recorded.

Track 1. Bass

| Track 2. Chord | Track to be recorded on external sound source.

Track 3. Melody
⋮

In this case, set the external sound source receive channel to 2.

②Press the Track 2 key while holding down the REAL TIME key. (Track 2 is set as the real time recording track.)

③Keep POLY = 1 set no matter how many polyphonics are available on the external sound source. This is to allow the remaining 7-note polyphonic to be fully used on the CZ-5000.

④Press the RECORD key to begin recording. (Recording is impossible using the external sound source keyboard.)

```
┌─────────────────────┐
│0000-REC    ♩=132│
│POLY=1   BEAT=4M│
└─────────────────────┘
```

IV. Using two CZ-5000s for real time recording along with playback of recorded data.

Using a CZ-5000 as a master to make a new recording and the playback unit as a slave, real time recording can be performed while monitoring previous data. The two CZ-5000s must be synchronized.
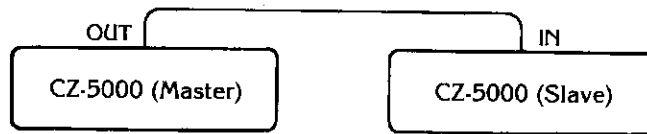
① Set the clock display (see page 52) of the recording master unit to CLK = INT, and that of the playblack (slave) unit to CLK = EXT.

② Set the recording track on the master CZ-5000.

③ Press the RECORD key to begin recording.

* Playback begins on the slave CZ-5000.

•KEY OPERATIONS

1 RESET
Resets both units. (Time value returns to 000.)
2 STOP
Suspends the master unit while maintaining the present recording track. Playback from the slave unit is temporarily suspended.
3 REV
Reverse and playback of the master unit (only) in the current recording track. The slave unit suspends playback at the point where the REV key is pressed.

Slave playback restarts when playback of the master unit reaches the point at which the REV key was originally pressed.
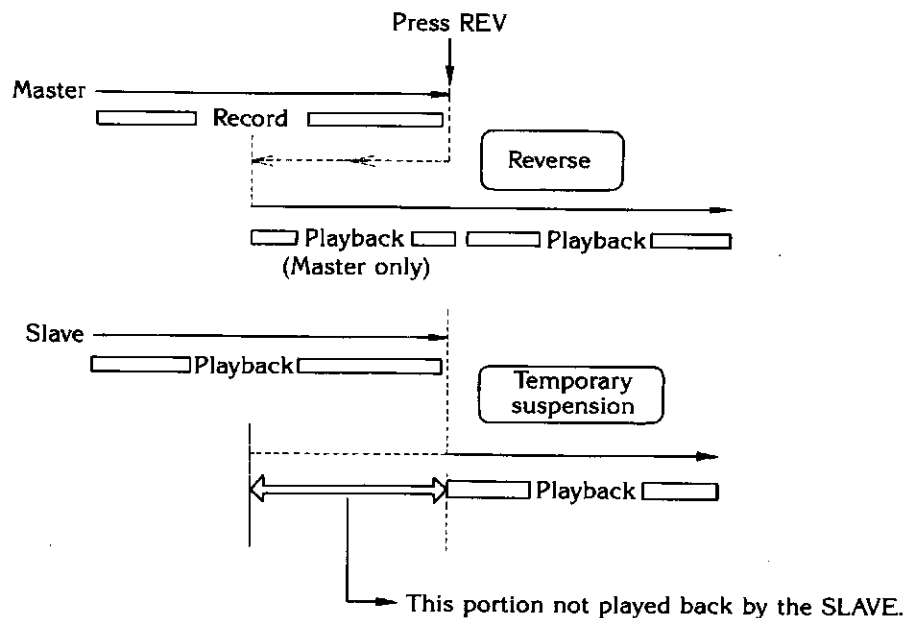
4 FWD
High speed playback of the master unit in the current recording track. High speed playback of the slave uniit.
5 PLAY
ADD ON recording (see page 38) possible from the current position if this key is pressed after pressing the STOP key. To rerecord an entire track, press the RESET key, set the track to be recorded, and press the PLAY key.

1. Please be careful of extreme temperatures, moisture and direct sunlight.

Please avoid using or storing your CZ-5000 in places subject to direct sunlight, excessively moist places or near air conditioning and heating appliances where temperatures and moisture tend to be extreme.

2. Please do not drop this instrument or subject it to strong shocks.

Subjecting this precision instrument to strong shocks may cause malfunctioning, so please be very careful. When carrying the CZ-5000 with you or transporting it, please protect it properly with shock-absorbant packaging, in particular the keyboard and switches.

3. Make sure no foreign matter gets into the inside of this instrument.

Please take care that no foreign objects, especially metal objects such as hair pins, sewing needles or coins gets into the instrument e.g. through the gaps between the keys. Also make sure no water or other fluids get in. Any metal objects or water entering the instrument can cause malfunctioning as well as an electric shock hazard.

4. Customizing may cause malfunction and accidents.

The CZ-5000 uses many high-precision electronic components. Converting it in any manner or carelessly touching the internal parts may cause malfunction and accidents and should therefore be avoided under all circumstances.

5. Please do not use thinner and similar chemicals when cleaning this instrument.

When cleaning your CZ-5000, use a soft cloth dampened with a neutral detergent solution which has been wrung out completely to wipe the keyboard etc.
Use of thinner, alcohol, benzene and similar chemicals should be avoided under all circumstances.

6. Insert and remove cartridges only after power has been turned off.

Be sure to turn off power when inserting or removing cartridges to protect the RAM.

Model	CZ-5000
Keyboard	61 keys/5 octaves
Sound source	PD (phase distortion) system
Voices	16 (1 DCO) or 8 (2 DCOs)
Modes	NORMAL/TONE MIX/KEY SPLIT/SEQUENCER
Programmer	32 preset voices (fixed) 32 memory voices (exchangeable) WRITE, COMPARE/RECALL

Parameters	DCO 1/DCO 2
	Waveform (33 types)
	Pitch envelope (STEP=1~8/RATE=00~99/LEVEL=00~99/
	                    SUSTAIN/END)
	DCW 1/DCW 2
	Key follow (RANGE=0~9)
	Wave envelope (STEP=1~8/RATE=00~99/LEVEL=00~99/
	                    SUSTAIN/END)
	DCA 1/DCA 2
	Key follow (RANGE=0~9)
	Amp envelope (STEP 1~8/RATE=00~99/LEVEL=00~99/
	                    SUSTAIN/END)
	Vibrato (WAVE=1~4/DELAY=00~99/RATE=00~99/
	            DEPTH=00~99)
	Octave (RANGE=-1/0/+1)
	Detune (OCT=0~3/NOTE=00~11/FINE=00~60)
	Line select (1/2/1+2'/1+1')
	Ring modulation/Noise modulation
	Initialize

Sequencer	8 recording tracks Recording system: Real time (3500 notes max.)/Manual (7000 notes max.) Track check, ADD ON recording, Play, Record, Stop, Reset, Forward, Delete, Clear, Repeat, Track ON/OFF, Timer (4-digit), Steps (3-digit), Tem- po (♩=40~256), Beat (1~9), Local ON/OFF
Tone mix	Tone 1 (LEVEL=00~15)/Tone 2 (LEVEL=00~15)
Key split	Split point (01~60) LOWER (LEVEL=00~15)/UPPER (LEVEL=00~15)
Effect/Overall control	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 depth (00~99)/Modulation ON/OFF Master tune (±100 cents) Key transpose (G~F#) Master volume Chorus control
Data entry	Value ▼(SAVE)/▲(LOAD), Cursor ◀(NO)/▶(YES), Envelope step ▼/▲, Envelope point (SUSTAIN, END)
LCD	Dot matrix (32-character)

Data SAVE/LOAD	Cassette tape (Timbre and sequencer data SAVE/LOAD) Cartridge (Timbre data SAVE/LOAD: 32 timbres)
Other	Solo
Rear panel	LINE OUT jacks (R/L), Headphone jack (stereo), Sustain jack, Foot volume control jack, MIDI jacks (IN/OUT), Protect switch (ON/OFF), Cartridge slot, Power jack
Power supply	AC 100V, 120V, 220V, 240V
Memory back up	3 size D dry cells (Battery life: Approximately 1 year)
Power consumption	26W
Dimensions	1025 (W) × 341 (D) × 127 (H) mm
Weight	11.7 kg (including batteries)
Accessories	AC power cord, MT connecting cord (8-pin), Plug & cord set, Dust cover, 3 size D dry cells

*Design and specifications are subject to change without notice.

WARNING:

CHANGING THE VOLTAGE SELECTOR MAY REQUIRE THE USE OF A DIFFERENT LINE CORD OR ATTACH-MENT PLUG, OR BOTH. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, REFER SERVICING TO QUALI-FIED 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 recep-tion. 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 protec-tion 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 inter-ference by one or more of the following measures:

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

If necessary, the user should consult the dealer or an experienced radio/television technician for additional sug-gestions. The user may find the following booklet prepared by the Federal Communications Commission help-ful: "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.