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MSX

YAMAHA

YRM-101

FM MUSIC COMPOSER

OWNER'S MANUAL

COMPOSITEUR DE MUSIQUE FM

MANUEL D'UTILISATION

NIPPON GAKKI CO., LTD.
PRINTED IN JAPAN

INTRODUCTION

Congratulations on your purchase of the Yamaha FM Music Composer.
In order to appreciate the full performance of this program, please read this Owner's Manual carefully and completely. Keep it in a safe place for future reference.

Features

This FM Music Composer is a ROM cartridge program that enables your Yamaha CX5M Music Computer for computer aided music composition, orchestration, and full performance control. Here is a list of this program's main features.

- Music composition with up 8 separate parts can be performed automatically. Different voices can be used for each separate part, and changed at any time, permitting full orchestration control.
- Notes are entered from either the CX5M ASCII keyboard or from Yamaha YK-01 or YK-10 Music Keyboard. The external Keyboard facilitates easier note entry, and also permits keyboard accompaniment of "automatic" performances (performances which are electronically "recorded" and "played" by the computer.)
- Notation for dynamics (crescendo, decrescendo, etc) and tempo (ritardando, atempo, etc.) is entered from the computer keyboard, enabling a wide range of expressive control.
- The FM Music Composer can be used for automatic performance whereby compositions are played back on Yamaha's DX synthesizers and other MIDI compatible instruments.
- The full music score, along with all performance control data, can be converted to "hard copy" (printed out) with a suitable MSX-compatible external printer and/or saved on cassette tape.

CONTENTS

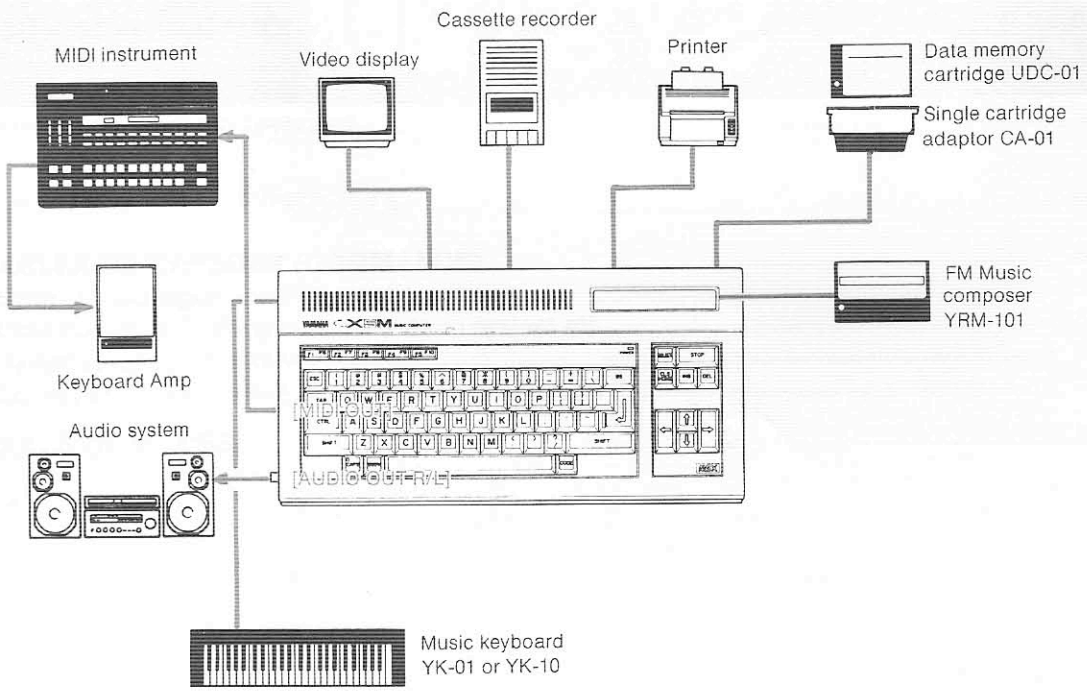
CHAPTER I ASSEMBLING THE SYSTEM

SYSTEM COMPONENTS

Here is a list of the components that you need to enjoy the full potential of the FM Music Composer.

• **Yamaha CX5M Music Computer**	The main unit of the system. This computer includes a built-in Yamaha Sound Synthesizer unit.
• **Color monitor or Color TV plus RF Modulator/Adaptor**	Necessary for visual control of the composition and for audio output (if you do not connect an audio system).
• **Yamaha Music Keyboard (YK-01 or YK-10)**	For easy input of data and accompaniment.
• **Cassette recorder**	Necessary for storing the performance data.
• **Yamaha Data Memory Cartridge (UDC-01) plus Single Cartridge Adaptor (CA-01)**	To read the voice data created with the FM Voicing Program.
• **MSX standard printer**	To print your compositions.
• **Stereo amplifier/speaker system or Keyboard amplifier**	To fully enjoy the high quality FM sound.
• **MIDI instruments plus MIDI cable**	To further extend the range of performance capabilities.

Fig. 1 System configuration

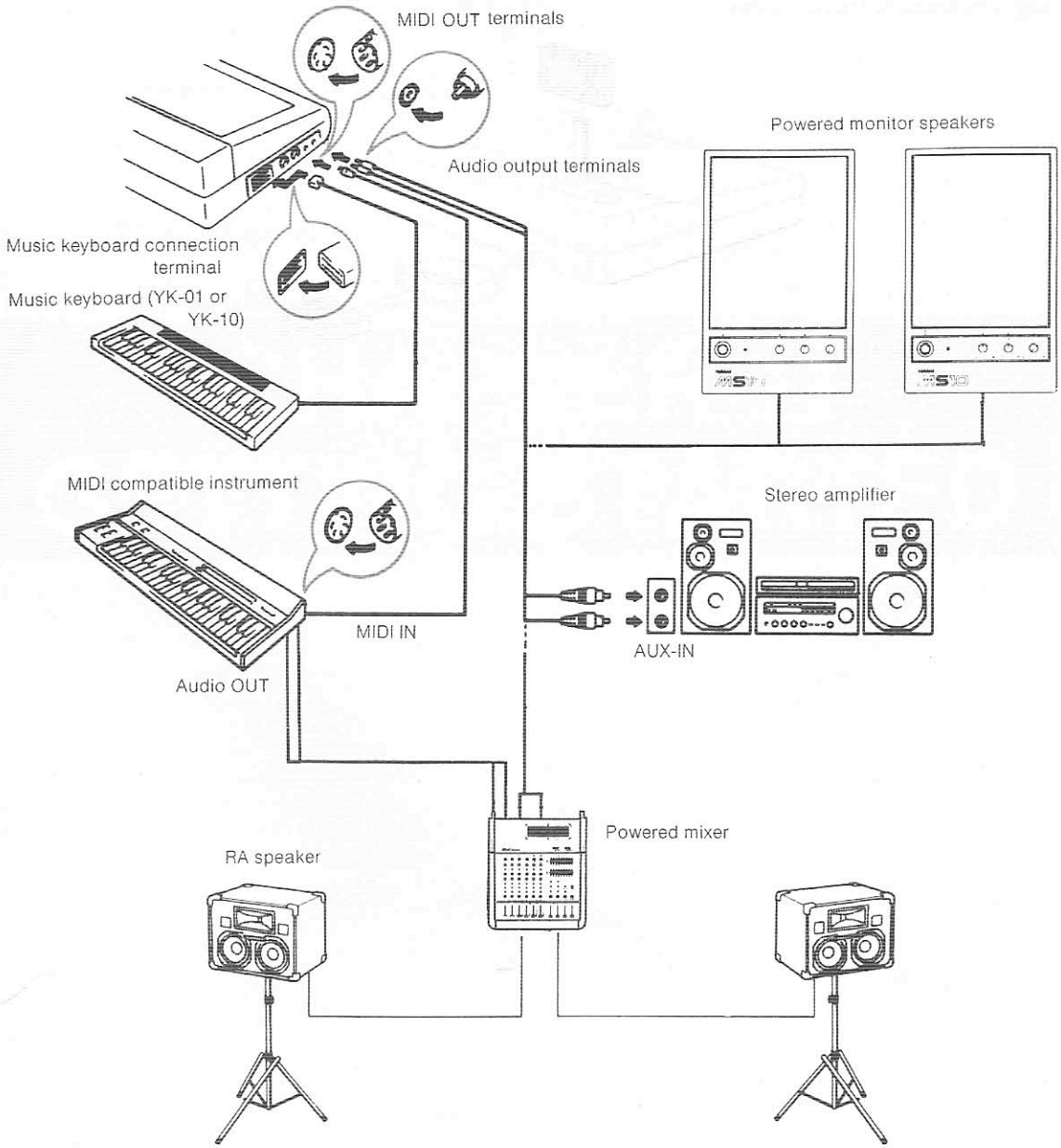


SYSTEM CONNECTIONS

Please refer to the Owner's Manual supplied with your CX5M Music Computer for connecting video display, printer, and cassette recorder. The following diagram is given for easy reference. Please read carefully the Owner's Manual provided with each component before assembling.

Caution: Before connecting the system, be sure that the power to all components is turned OFF.

Fig. 2 Connection diagram for Music Keyboard, audio system and MIDI instrument



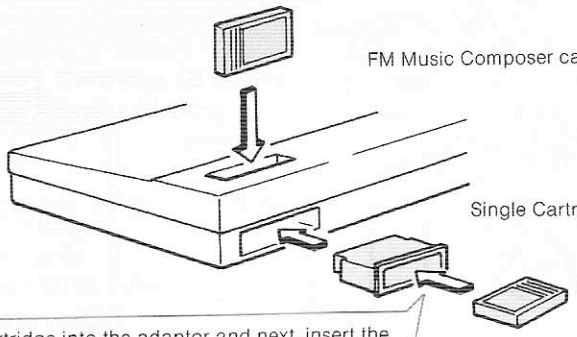
PROGRAM AND DATA MEMORY CARTRIDGE

Precautions regarding the use of cartridges

- **Always** turn the power to CX5M OFF before inserting or removing a cartridge; removing or inserting a cartridge when the power is ON can easily cause trouble.

- **Always** return the cartridges into their protective package after use and reinstall the rear slot cover when a cartridge is removed from rear slot as dust on the connection pins can produce erratic operation.

Fig. 3 Insertion of the cartridges



First, insert the cartridge into the adaptor and next, insert the assembly into the rear slot.

CHAPTER II
GETTING STARTED

POWER-ON DISPLAY

Starting the program

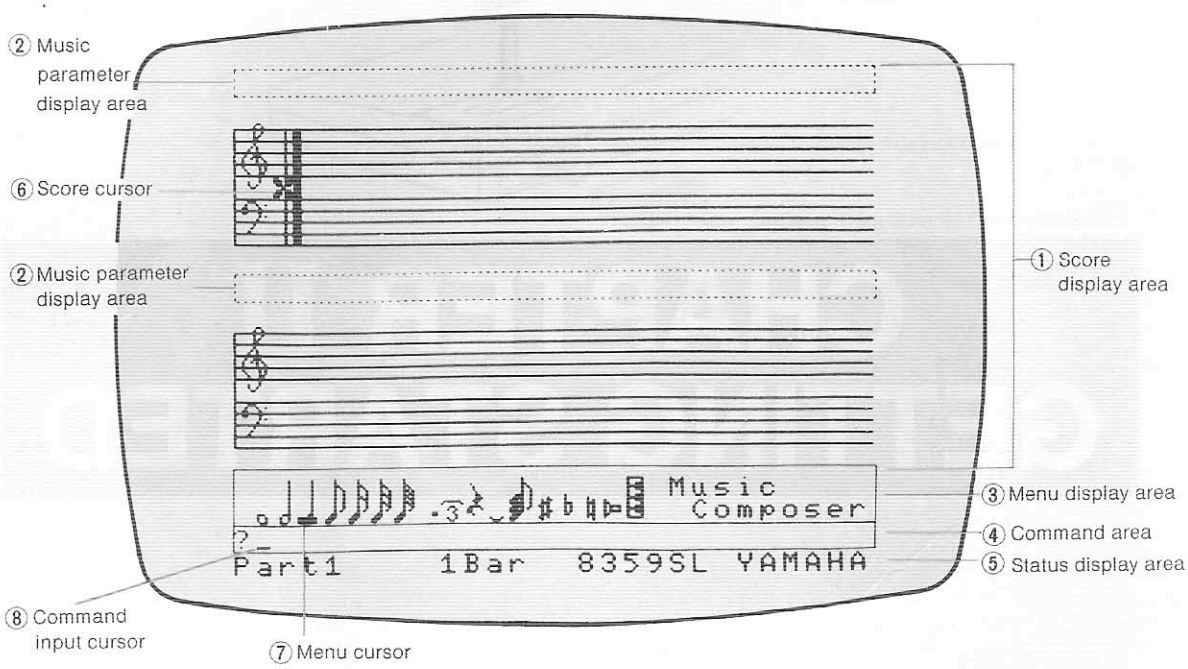
(1) Make sure that all equipment (including the Data Memory Cartridge) is properly connected.

(2) With the power to the computer OFF, insert the FM Music Composer ROM cartridge into the upper slot of your CX5M.

(3) Turn the power to the computer ON. The program will start automatically and the screen will look like Fig. 4 if the program is running correctly.

★ If the program does not run, turn OFF the power to the computer and make sure that the ROM cartridge is correctly inserted.

Fig. 4 Screen display when power is turned ON



Score display area ①

The great staff (bass and treble clefs) is displayed on two levels. Notes and musical signs (symbols) are displayed on the staff. The **score cursor** ⑥ displays the input position of the notes and performance symbols. It also indicates the pitch. The two-level great staff continues from the upper level into the lower level and constitutes a single part.

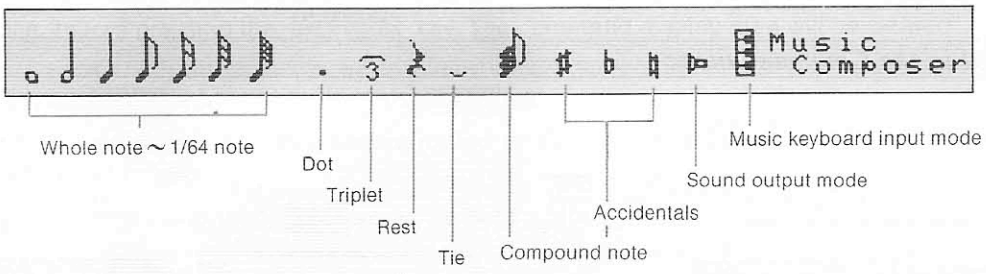
Music parameter display area ②

The area above the score is the musical sign area used to display music parameters such as dynamic markings, etc.

Menu display area ③

The symbols used for entering notes are displayed here. The various symbols and their meanings are explained in Fig. 5 The **menu cursor** ⑦ is used to select symbols. The color of the symbols displayed on the screen will be reversed when it is selected. Selection of these symbols is outlined on pages 16 and 17.

Fig. 5 Symbols displayed in the menu display area



Command Area ④

The FM Music Composer has two data input modes.

- **Note mode:** used for the input of notes and rests.
- **Command mode:** used to input performance data other than notes and rests (dynamics, tempo, repeat, etc.) and also for input of control commands.

These two modes are selected with the SELECT key and the current mode is indicated by either of the two following signs on the left edge of the command area at the bottom of the screen.

#	Note mode
?	Command mode

The display will be set to "?" (Command mode) and the **command input cusor** ⑧ will indicate the position of the command to be entered when the power is turned on. The display will change to " # " (Note mode) if the SELECT key is pressed once. Pressing it once again toggles the display back to "#" (Command mode).

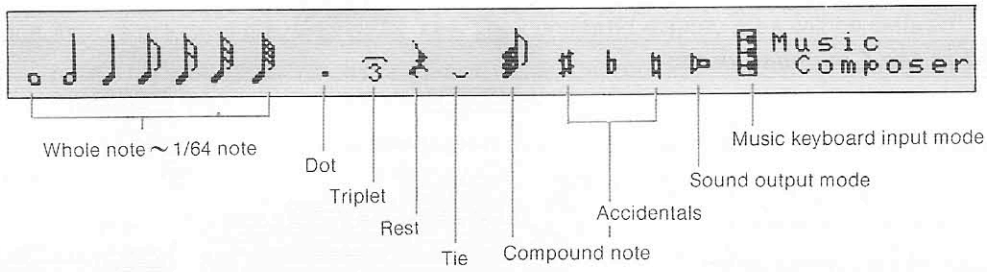
Commands are entered in the Command mode by typing the command into the command area following the "?", and then pressing the RETURN key.

Status display area ⑤

Information for the input of data to the score, and reference information, are displayed on the bottom of the screen. The meaning of the information is as follows:

- **Part:** this is the part number of the score which is displayed on the screen
- **Bar:** this indicates the number of the first bar displayed
- **SL (Steps Left):** this is the display for the memory used to store performance data. It indicates the remaining number of steps which can be entered. Each musical datum (a note, sign, etc.) is considered to be one step. The indicated value will decrease by one every time there is an input of musical data. The system will display 8359 SL when the power is turned on. This number does not represent the maximum number of notes which can be "recorded" since dynamic symbols, rests, and so forth all use up one step.

Fig. 5 Symbols displayed in the menu display area



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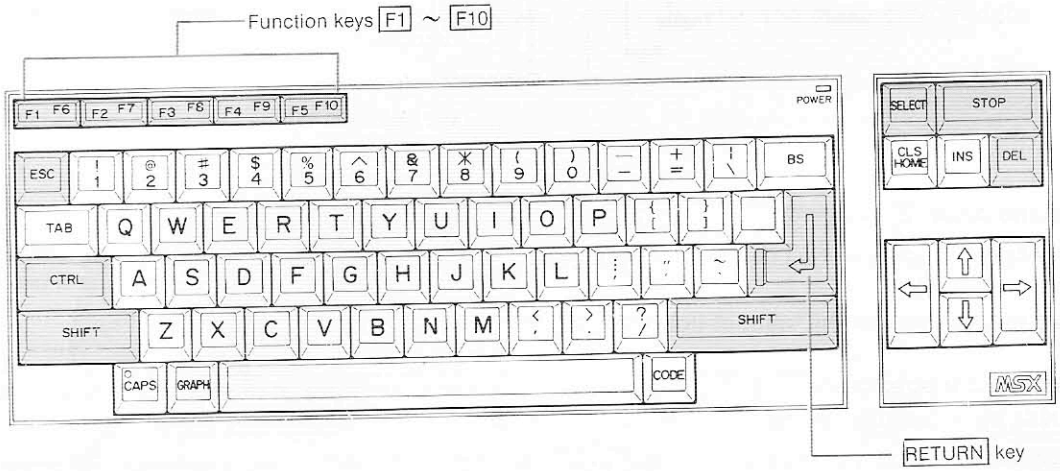
KEYBOARD OPERATIONS

The computer keyboard is used for both data input both in Command mode and Note mode. SELECT key switches between Command and Note modes. Here is an explanation for the use of the other keys.

Keys used in the Command mode

Fig. 6 Keys used in the Command mode



There are three kinds of command keys.

Keys used to input a command

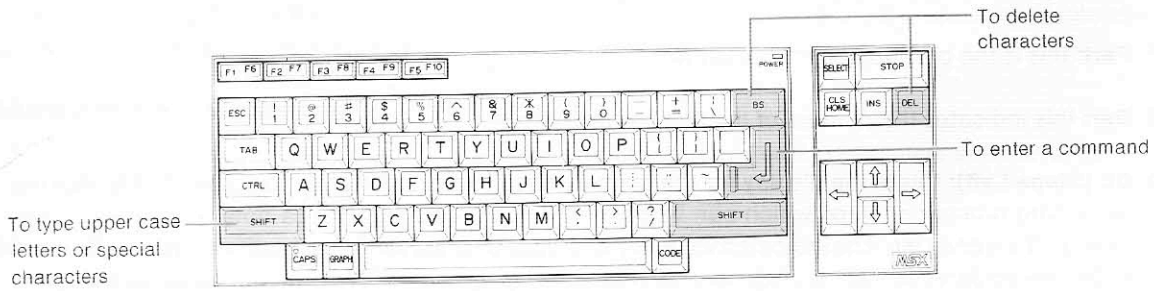
The Command that you type in is displayed in the command display area.

(1) To type an upper case letter or a special symbol like "#", press the SHIFT key while typing the character.

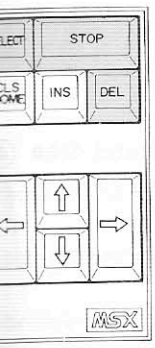
(2) To delete a wrong character, press the BS key or the DEL key. The command input cursor will move one position to the left, erasing the mistakenly input character.

(3) When a command is correctly typed, press the RETURN key to enter it.

Fig. 7 Keys used to input a command



te mode. SELECT
e of the other keys.



RETURN key

y while typing the

d input cursor will

To delete characters

To enter a command

Keys used to cancel a command

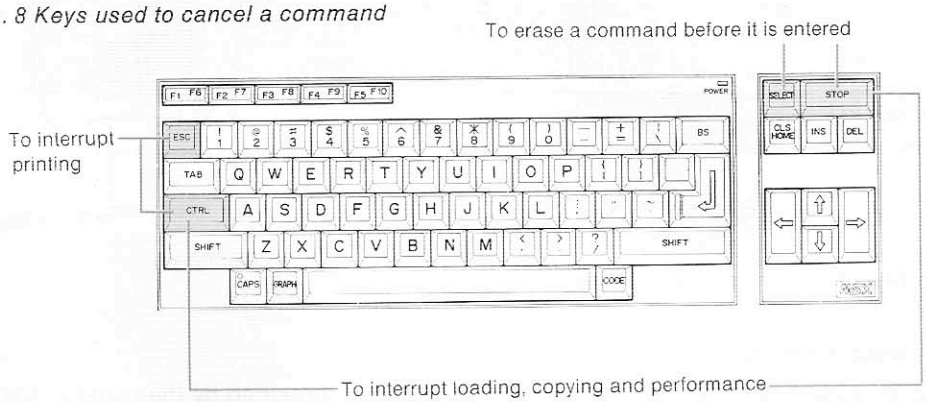
(1) You may always erase a command by pressing the STOP key once or the SELECT key twice before pressing the RETURN key. The command display area will be cleared.

(2) To interrupt performance or copying after the corresponding commands have been entered, press the STOP key while holding the CTRL key.

(3) The loading of data can also be interrupted by the CTRL + STOP keys but the computer memory will be cleared.

(4) To interrupt printing press ESC key while holding the CTRL key.

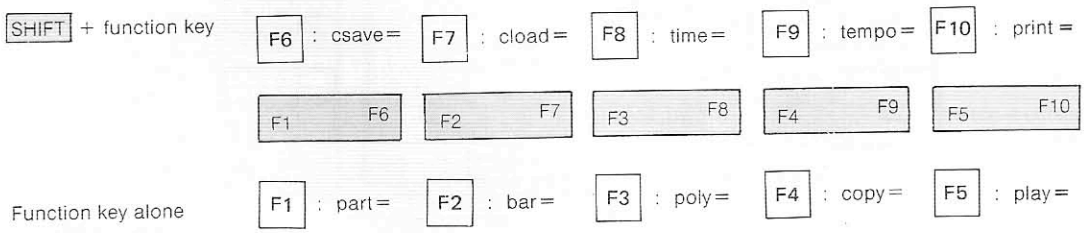
Fig. 8 Keys used to cancel a command



Keys used for easy input of some commands

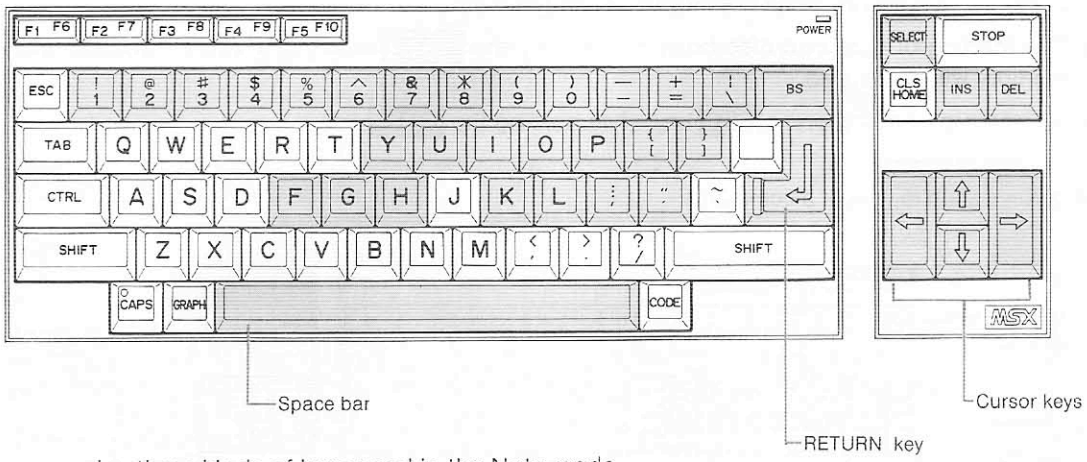
The function keys showed in Fig. 6 allow the input of some commands by pressing only one or two keys instead of typing the command. To obtain the function keys F6 ~ F10, use the SHIFT key.

Fig. 9 Command associated with the function keys



Keys used in the Note mode

Fig. 10 Keys used in the Note mode

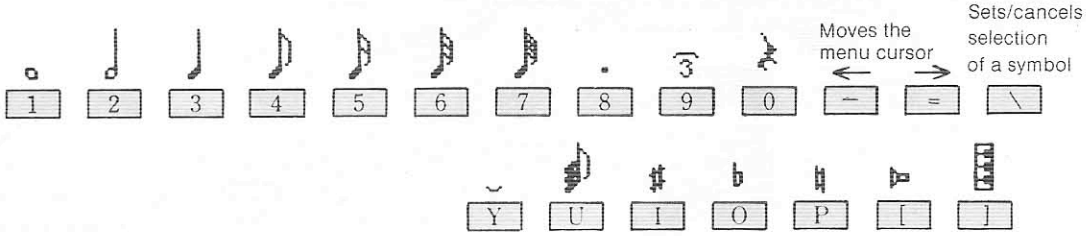


There are also three kinds of keys used in the Note mode.

- Keys used to select symbols from menu

Fig. 11 shows the keys used to select item from the menu. Selection obtained by the numeric keys [1] ~ [7] can be cancelled by another selection. The effect of [8], [9], [0], [\], [Y], [U], [I], [O], [P], [[], [] is cancelled by pressing the same key again. When a symbol is selected, its color is reversed.

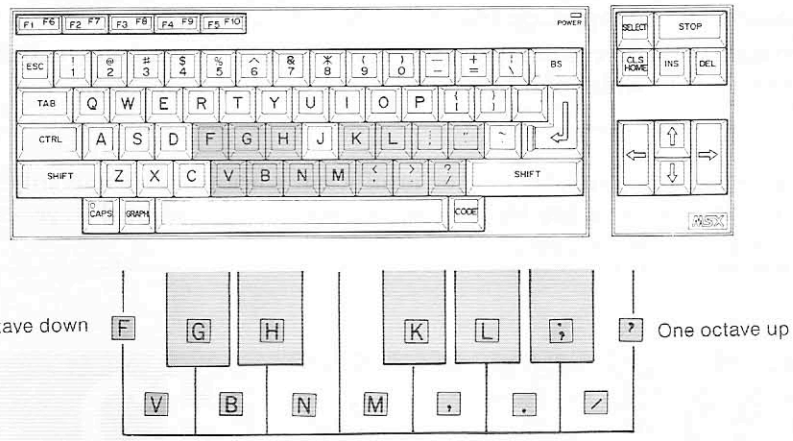
Fig. 11 Keys used to select symbols from the menu



Music keyboard-like keys

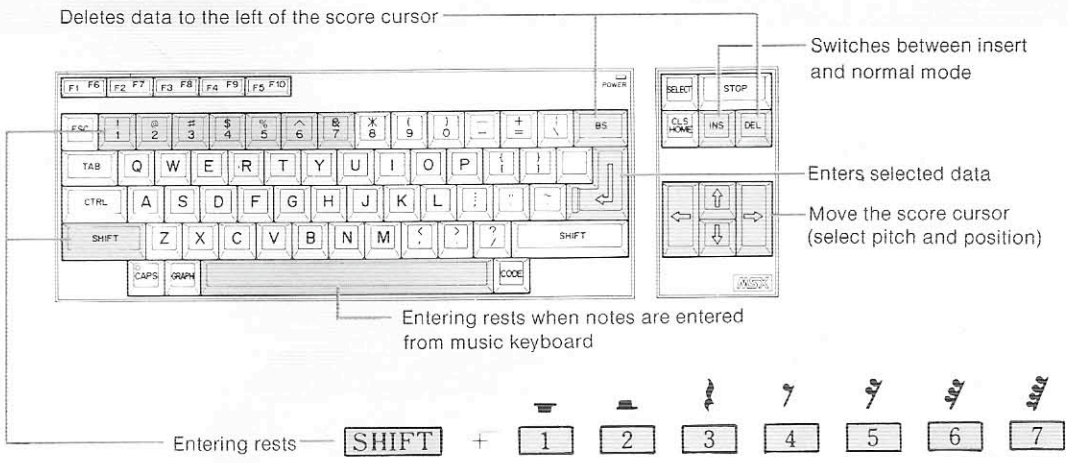
The keys showed in Fig. 12 are used for easy input of the pitch. Their configuration represents one octave of a music keyboard. F lowers the score cursor by one octave; ' (apostrophe) raises the score cursor by one octave.

Fig. 12 Music keyboard-like keys



Key used for entering data on the score and for editing

Fig. 13 Keys used for entering data and for editing



OUTLINE OF OPERATION

- The FM Music Composer enters notes, rests, tempo and dynamiçs parameters, voice numbers and other music parameters directly onto the score.
- The score can be written with a maximum of 8 parts which will play simultaneously by the PLAY command.
- Each note or parameter is handled as a single instruction. The maximum number of notes and performance data which can be entered depends on how much of the 32 Kb RAM capacity of the computer is occupied by voice data. 8359 notes/parameters can be entered if only the 48 voices in the FM synthesizer are used. Approximately 1000 units of this memory capacity are taken up by additional voice data when voices created with the FM Voicing program are loaded. The amount of data for notes and signs which can be entered will be reduced accordingly.

Note:
The processing capacity of the computer may be insufficient when simultaneous trill play of a large number of parts or other performance techniques that require concentrated large-scale processing are attempted. If this occurs, the tempo will be delayed.

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CHAPTER III
OPERATING THE FM MUSIC COMPOSER

The cursor

The staff shown in Fig. 4 (page 6) will be displayed when the power is turned on. The score is created by entering notes and other music parameters onto this staff. The data input onto the score can be divided into notes and other music parameters. Notes and rests are entered in the Note mode while music parameters are entered in the Command mode. The input position on the score is indicated by the score cursor. The note or music parameter will appear on the score after it is entered and the score cursor will move one position to the right. The score cursor moves to the lower level when it reaches the right end of the upper level. The entire score is scrolled up when the score cursor reaches the right side of the lower level (refer to Scrolling p. 22). The score cursor can only be moved by the cursor keys when in the Note mode. The [←] key moves the score cursor to the left and the [→] key moves the score cursor to the right. The cursor will not move into empty areas of the score.

Setting the part

The FM Sound Synthesizer unit allows a maximum of 8 notes and 8 voices to be played simultaneously. The FM Music Composer corresponds with this by allowing independent input of up to 8 parts. Thus, setting the parts is the first step in creating a score.

Procedure for setting parts

(1) In the Note mode, push the [SELECT] key to switch to the Command mode.

(2) Push the [F1] key which is equivalent to typing "part = ", and then type the numeric value (1 ~ 8) corresponding to the part to be set.

(3) Push the [RETURN] key to enter the input. The new part number will be displayed at the lower left corner of the screen.

★ The part number default is 1 when the power is turned on.

Setting the key signature

The key signature may be chosen freely. For example, "A major" is indicated by three sharps (#) and "F major" is indicated by one flat (♭). Because these sharps and flats (# and ♭) appear at the beginning of the score as the key signature, they need not be specifically written out for each note, which makes the score easier to read. The key should always be entered unless the song is in the key of "C major" or "A minor" (which of course have no sharps or flats).

Input of the key signature

(1) When in the Note mode, press the [SELECT] key to switch to the Command mode.

(2) Using the form "key = x", type this command, where x corresponds to the key signature. These key commands are shown in Table 1. For example, "A major" can be entered as "key = A", "key = f#" or "key = 3#".

(3) Input is completed by pressing the [RETURN] key. The key signature will appear at the top of the score.

★ The key signature appears only on the treble clef.

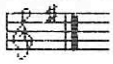
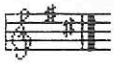
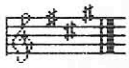
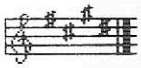
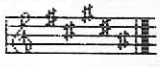
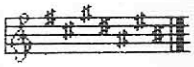
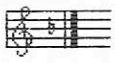
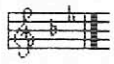
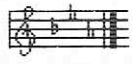
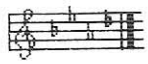
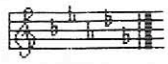
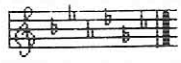
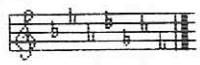
★ "C major" (A minor) is the "default" key signature if no other key signature is set.

★ The key signature can be changed in the middle of a composition.

★ Flats (♭) are entered as a lower case letter b.

★ Upper case letters (major key signatures) are input by typing the letter while holding down the SHIFT key. Lower case letters, representing minor key signatures, are typed without using the SHIFT key.

Table 1 Key signature and corresponding input symbols

Key signature display	Key signature name	Interchangeble input symbols for the command "key = "		
	G	G	e	1#
	D	D	b	2#
	A	A	f#	3#
	E	E	c#	4#
	B	B	g#	5#
	F#	F#	d#	6#
	C#	C#	a#	7#
	F	F	d	1b
	B♭	Bb	g	2b
	E♭	Eb	c	3b
	A♭	Ab	f	4b
	D♭	Db	bb	5b
	G♭	Gb	eb	6b
	C♭	Cb	ab	7b
	C	C	a	0

Time signature and bars

(1) When in the Note mode, press the SELECT key to switch to the Command mode.

(2) Input the time signature in the form "time = a/b".(a = 2, 10, 12, 16 and b = 2, 4, 8, 16). For example, if the time signature is three-quarters, type "time = 3/4 "."time = "can be entered more quickly by pressing the F8 key (SHIFT key + F3 key).

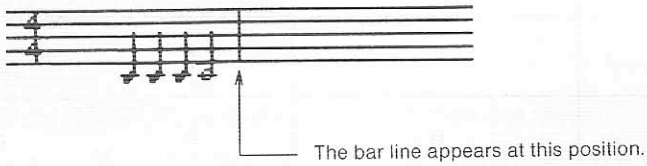
(3) Press the RETURN key to complete input. The time signature will appear at the top of the score.

★ The time signature only appears on the treble clef.

★ 4/4 time is the "default" time signature if no other time signature is set.

★ The time signature can be changed in the middle of a song. The bars will automatically be located according to the time signature. Notes that exceed the bar time limit will appear in the next bar. Be careful with the input notes in order to prevent this from occurring. For example, in 4/4 time, notes are entered as shown in Fig. 14.

Fig. 14 Location of the bar



In some cases, the bar may appear in the wrong place. The original position can be reset by designating the part.

Entering notes

First length and then pitch must be specified when notes are entered. The first to be set are the time values of notes, and dots, triplets, ties, and accidentals, if any.

Setting the note, dot signs, triplet signs, tie signs and accidentals

These appear in the menu display area of the screen and are selected in the Note mode by pressing the SELECT key. There are two ways to select them.

- Selection using the menu cursor

The menu cursor is a red mark [=] which appears in the menu display area.

(1) Move the menu cursor to the position of the desired symbol by using the [←] key (moves the cursor to the left) and the [=] key (moves the cursor to the right). The cursor arrows are not used.

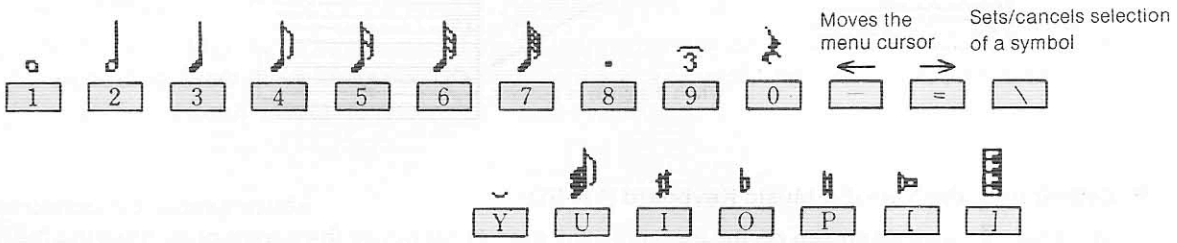
(2) Press the [\] key to select the parameter which appears at the position of the menu cursor. The color of the parameter marking will be reversed to confirm the selection. The selection can be cancelled by pressing the [\] key again with the menu cursor at a different position.

(3) Repeat the above steps (1) and (2) to select any other of the desired signs. At least one note length must be selected as a default; you cannot deselect all note lengths.

- Selection from the keyboard

Parameters may also be selected by pressing the keys which, as shown in Fig. 15, correspond to individual symbols. The color of the selected symbol will be reversed. The selection can be cancelled by pressing a different key.

Fig. 15 Keys used for selecting parameters on the menu



The next step is to set the pitch of the notes. Note input is complete when the pitch setting is added to the previously set parameters. The note will then appear on the score.

Setting the pitch → entering notes

To set the pitch, first enter the Note mode by using the [SELECT] key. The following three methods can be used interchangeably to set the pitch.

- Setting the pitch by the score cursor

(1) Set the score cursor to the position on the staff corresponding to the desired pitch. The score cursor is moved by the [↑] key which moves the cursor up and the [↓] key which moves the cursor down.

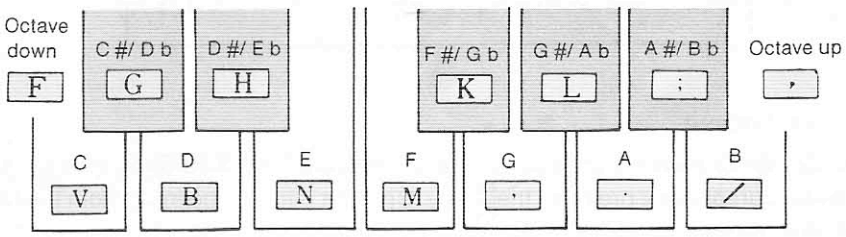
(2) Sharps and flats are added by the previously described procedure.

(3) Input is completed by pressing the [RETURN] key. The note will then appear on the score.

- Setting from the music keyboard-like keys

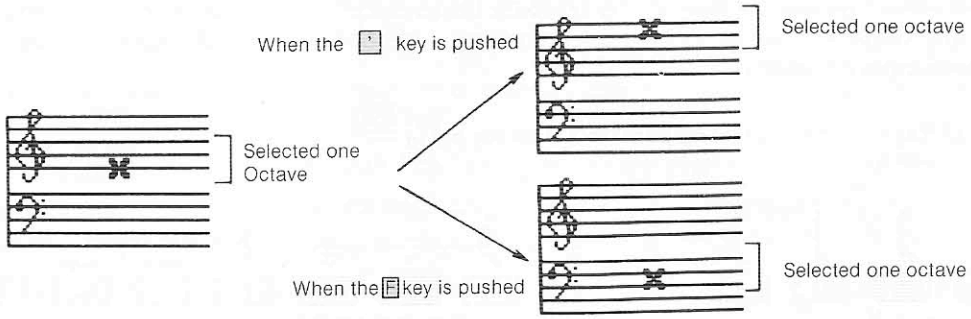
The keyboard is arranged, as shown in Fig. 16, in a one one-octave, C through B, 12 note configuration similar to a piano keyboard. When notes are directly entered by pushing the desired keys, the previously set key signature will be ignored. The keys are arranged over a range of one octave, but the octave can be raised or lowered by the octave up and octave down keys, allowing notes to be entered anywhere on the score. The present selection range is one octave, including the position of the cursor.

Fig. 16 Keys used for entering notes



(The range shown is that of C major)

Fig. 17 Relationship between the position of the cursor and the selected range

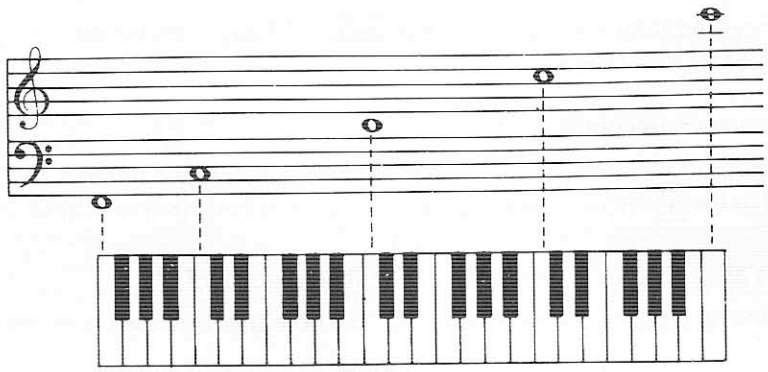


- Setting from the Yamaha Music Keyboard (YK-01)

(1) The mark is shown on the menu display area (selected by the cursor or by pressing the [ ] key).

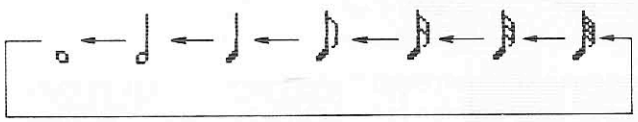
(2) The pitch of the keys depressed on the Music Keyboard will be entered.

Fig. 18 Relationship between the Music Keyboard and notes entered



(3) When a music keyboard key is pressed, a note of the previously set length (on the menu) will be entered. If the key is held down, the selected note length (color reverse displayed) on the CX5M menu display will move. The note will be entered having the length indicated at the instant the key is released, and then the default will revert to the previous menu-selected length.

Fig. 19 Notes are selected in the direction indicated by the arrow when a key is held down.



★ Setting sound output

The actual notes can be heard while they are being entered. This is done by selecting the mark by using the menu cursor or by pressing the [ ] key. Only the pitch of the input from the Music Keyboard can be heard, not necessarily the selected note length.

Precautions regarding note input and score display

(1) The accidentals use b for flat notes, and # for sharp notes. For example, if the key signature is G major (one #), input of B flat will be displayed as A sharp, which is enharmonically equivalent. If the signature is E-flat major (three b's), input of A sharp ♯ will be displayed as B flat.

(2) Full notes are displayed with a length of 4 quarter notes.

(3) Sixty-fourth notes are always entered as triplets.

(4) The standard notation for triplets is ♫ but it is displayed on the score as 𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯.

(5) When setting the tie symbol, enter the tie mark when the prior note is entered. For example, to input ♩‿♪ set the quarter note and the tie mark, and input the note. Next, set the tie mark to OFF and input the eighth note.

Entering the octave marks

The FM Sound Synthesizer unit has a range of 8 octaves but the FM Music Composer is only capable of displaying 4 octaves on the score. The octave marks are used for entering notes higher and lower than the range of the displayed score. They are as follows:

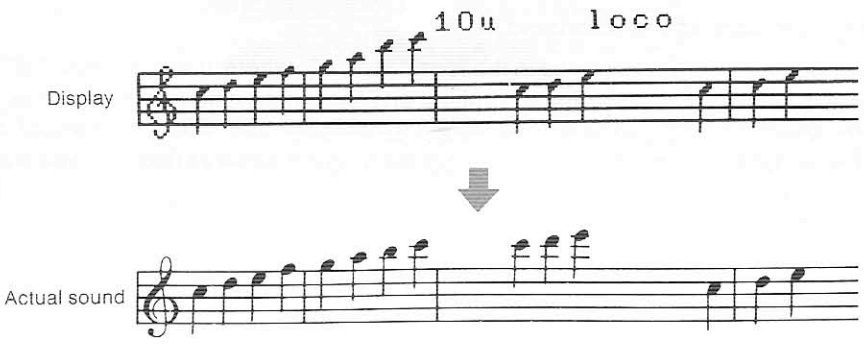
1 ou (1 octave up)	raises the pitch by one octave
2 ou (2 octaves up)	raises the pitch by two octaves
1 od (1 octave down)	lowers the pitch by one octave
2 od (2 octave down)	lowers the pitch by two octave

These values are entered by setting the system to Command mode and typing "nod" or "nou" (n=1 or 2) plus RETURN. Notes entered after these signs are set will fall within the new range. For example, setting the "1 ou" mark means that the pitch of all input notes will be one octave higher than the displayed pitch. On the other hand, the pitch that some voices actually try to produce will be one or two octaves higher or lower than the score indicates. Using such voices when the octave mark is set can cause the actual pitch to exceed the range of the FM sound generator. If this occurs, automatic pitch adjustment is made up or down in one octave units. This is the same as the transposition procedure given in chapter 4.

The effects of the octave marks are terminated by the loco symbol.

loco	terminates the effect of the octave symbol

Fig. 20 Changes in the actual sound caused by the octave mark



Setting the rests

There are three methods available for entering rests.

- Setting from the menu

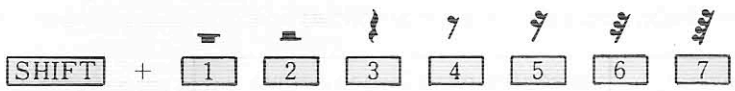
  (1) The rest marks and length are set in the menu display area. The [0] key is used to set rest marks and keys [1] – [7] are pressed to set time values. The menu cursor can also be used to set rests.

  (2) Input is completed by pressing the [RETURN] key. The rests will appear on the score.

- Setting from the keyboard

Rests can be entered directly from the keyboard by pressing any numeric key from [1] to [7] while the [SHIFT] key is held down. For example, a quarter rest 𝄽 can be entered by pressing key [3] while the [SHIFT] key is depressed.

Fig. 21 Keys used for entering rests



- Entering rests while also entering notes from the Music Keyboard

Rests can be entered by pressing only the [space bar] when the program is in the mode used for note input from the music keyboard (the mode set by selecting 𝄽 from the menu).

Select the length of rests to be entered by setting the note length displayed on the menu (i.e., type a 1 through a 7 prior to entering any rests). Continuing to press the space key will move the note selection display (color reverse displayed) of the menu-indicated length and a rest of the indicated length will be entered the instant the space bar is released (see Fig. 19).

Setting the voice

The FM Music Composer allows for performance of a maximum of 8 parts. You can assign a different voice to each part.

The voice can be selected from among those contained in the FM Sound Synthesizer unit and from those created by means of the Yamaha FM Voicing Program (YRM-102).

- Using voices contained in the FM Sound Synthesizer unit

  (1) Switch the input mode to the Command mode.

  (2) The voice number (1 ~ 46) is entered in the form "# = n", where n is the voice number. Refer to the Table of voices p.63 for the voice numbers and the corresponding voice names. There are 48 different types of voice data in the FM Sound Synthesizer unit. Voice numbers 47 and 48 are used for future applications. There will be no sound output if either of these numbers is set.

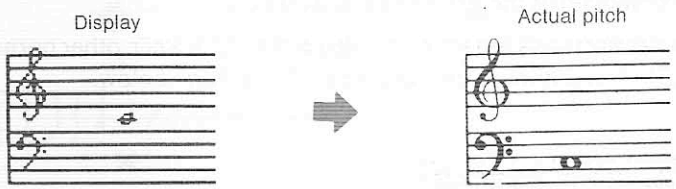
(3) Input is completed by pressing the RETURN key. #n will be displayed on the screen above the score.

★ If not otherwise set, the various parts will have the following voices:

Part 1	EPIANO2		Part5	TRUMPET
Part 2	EPIANO2		Part6	PICCOLO
Part 3	EPIANO2		Part7	EBASS1
Part 4	GUITAR		Part8	EBASS2

★ Some combinations of voices and notes may cause the actual pitch produced to be one or two octaves higher or lower than the note displayed on the screen. For example, the sound of EBASS 1 will have a pitch one octave lower than the note displayed on the screen.

Fig. 22 Pitch of the sounds of EBASS 1



★ When the voices are set separately, there may sometimes be too much vibrato or tremolo. This can be corrected by changing the LFO data (refer to page 50).

- **Using voices created by the FM Voicing Program**

(1) The first step is to load the voice data created by the FM Voicing Program from the cassette recorder or from the Data Memory Cartridge.

★ Place the tape in the cassette recorder and find the beginning of voice data file to be loaded.

★ Set the input mode to the Command mode and input "cload = VOICE". VOICE must be entered in capital letters (by holding down the SHIFT key).

★ The memory capacity will decrease by approximately 1000 steps when the voice is loaded.

★ If a data memory cartridge (UDC-01) is used for voice memory, the command "dcload = VOICE" must be used to load the voice data.

(2) Set the input mode to the Command mode.

(3) Input the desired voice (49 ~ 96) in the form "# = n". The voices created using the FM Voicing Program are numbered starting at 49. (1 ~ 48 are voices contained in the FM Sound Synthesizer).

(4) Input is completed by pressing the RETURN key. #n will be displayed on the screen.

NOTE: If the loading procedure cannot be carried out propely (cassette recorder or Data Memory Cartridge not connected or no voice recorded), you may cancel the operation by pressing CTRL + STOP .

Editing the score

This section deals with editing the score. Data refers to anything which can be entered onto the score, such as notes, rests, and other parameter markings.

Setting the part

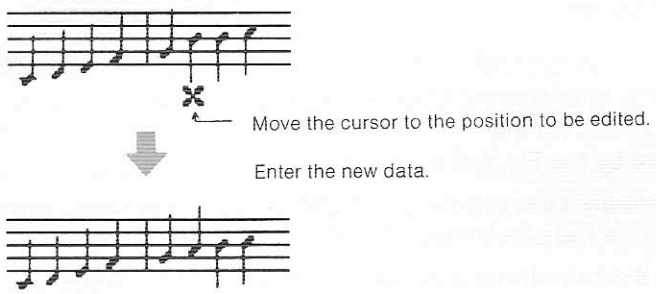
Set the part of the score which is to be edited. The part is set by typing " part = n" following the "?" in Command mode (where n = 1 ~ 8), and then pressing the RETURN key. The screen display will switch to the set part. The first section of the part will be displayed if data has already been input onto it.

Editing

When the pitch needs to be changed or in other cases where editing is possible simply by writing over the data previously input, position the score cursor over the data to be edited and enter the new data. The score cursor is moved by setting the input mode to the Note mode (#) and using the cursor keys ← and →for movement in the left and right directions.

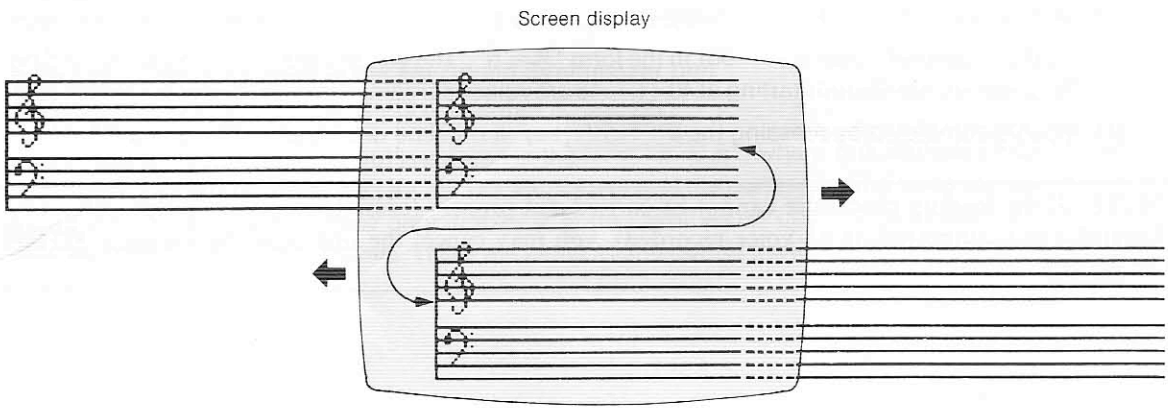
Data input is as usual; notes and rests are entered in the Note mode while other parameters are entered in the Command mode. This also applies for the section "Inserting" below.

Fig. 23 Editing



Continuing to press the cursor keys when the cursor is at the beginning or end positions of the displayed section will cause the screen to be scrolled further forward or backwards.

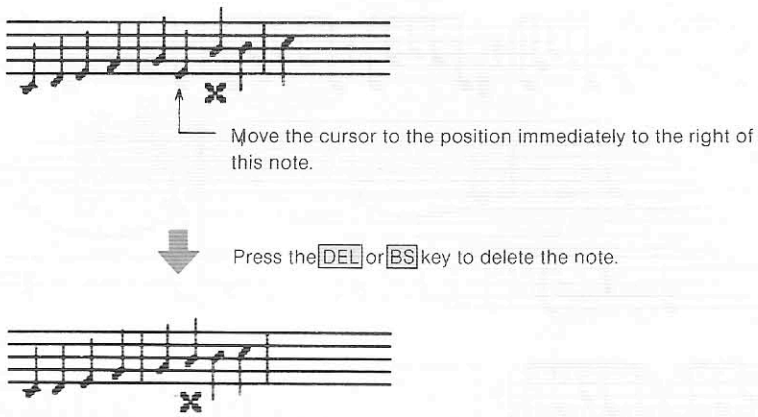
Fig. 24 Scrolling



Deleting

Incorrect or unnecessary sections can be deleted. With the computer set to the note mode, move the cursor to a position immediately to the right of the data to be deleted. Push the DEL or BS keys while still in the Note mode to delete the data to the left of the cursor. The score to the right of the cursor will move one position to the left each time the DEL or BS key is pressed.

Fig. 25 Deleting



Inserting

The following procedure is used to insert new data between existing data. Push the INS key in the Note mode. The shape of the score cursor will change from ✕ (blue) to ✣ (red). This shape indicates the insertion mode. The insertion mode is exited by pressing the INS key once more from the Note mode.

Fig. 26 Shape of the score sursor

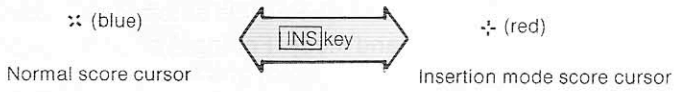
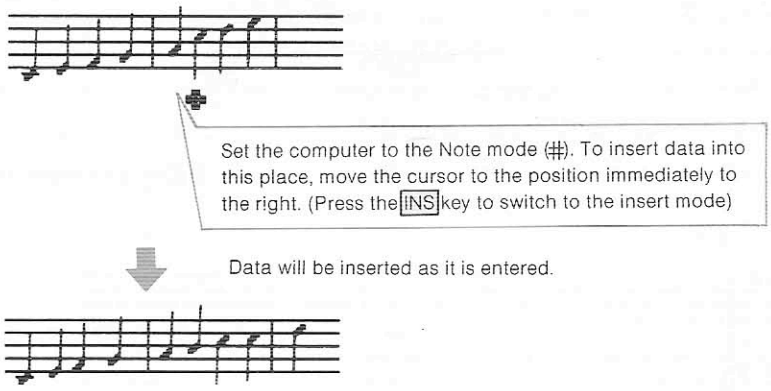


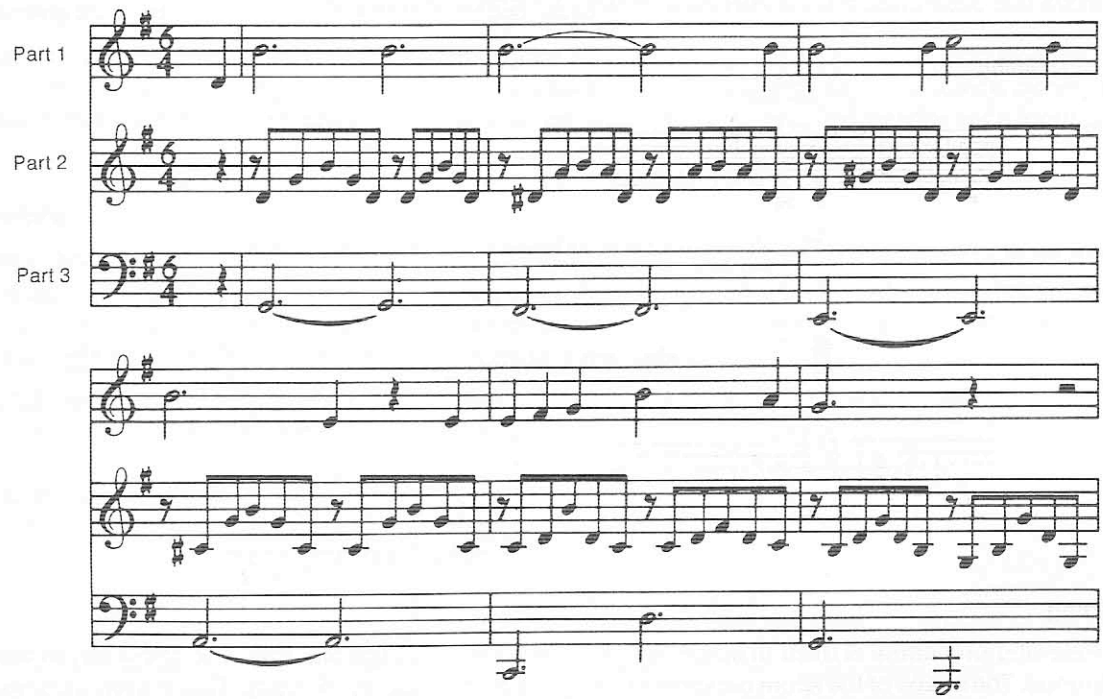
Fig. 27 Inserting



INPUT OF AN ACTUAL SCORE

The following procedure will input the following score and automatically play it back.
The first step is to turn on the power.

Fig. 28 Liebstraume No. 3 by Listz



Part 1

Setting the part

This score is arranged with three parts. Part 1 is entered first. Part 1 is automatically selected when the power is turned ON. Set the input mode to the Command mode. For input on part 1, push the RETURN key.

Setting the key signature

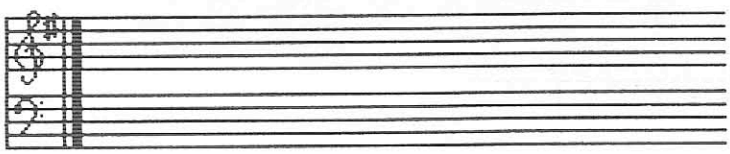
There is one sharp (#) next to the treble clef at the left of the score. This is the key signature, which shows that this piece is in G major. There is no need to mark the sharps for the F notes on this score, since they are already indicated in the key signature at the beginning.

(1) Set the input mode to the Command mode.

(2) Type "key = 1#" and press the RETURN key.

One # will be displayed on the score. (Remember the key signature is only indicated in the treble clef).

Fig. 29 Input of "key = 1#"



Input of the time signature

The time signature follows the key signature. This piece is in 6/4 time (6 quarter notes/bar). When this time signature is entered into the FM Music Composer, the bars will automatically be located accordingly.

(1) Set the input mode to the Command mode (?).

(2) Type "time = 6/4" and press the RETURN key.
6/4 will be displayed on the score.

Fig. 30 Input of "time = 6/4"

Notes and rests

The next step is to input the notes. Press the SELECT key to switch the input mode to the Note mode. There are various ways to input note and rest data. In the following instructions we describe the method which uses the computer keyboard.

The first note is a D in the C major scale (the C, D, E notes described will be those of the C major scale). This piece starts with an incomplete bar. In other words, the time signature of this piece is 6/4 and thus, there must be notes equal to 6 quarter notes in each bar. However, in this piece there is one quarter note in the first bar. The first bar must, with the FM Music Composer, be completed with rests or the position of the bars will be incorrect. The rests are entered before the notes. In the first bar, there is one quarter note. Therefore, the bar can be completed by entering 5 quarter rests, or equivalently, as shown here, by one whole rest and one quarter rest.

Press the following keys after confirming that the input mode is the Note mode (#).

(1) Enter a whole rest by pressing the 1 key while the SHIFT key is pressed. A whole rest mark 𝄻 will appear on the screen.

(2) Input a quarter rest by pressing the 3 key while the SHIFT key is pressed. If an input error is made, press the DELETE key and re-input the data.

(3) Now it is time for the first note to be entered. Because this is a quarter note, the 3 key is pressed for the note length ♩ as displayed on the menu. The pitch is D so the B key is pressed. A quarter note D will appear on the screen.

(4) The next note is a B dotted half note. The 2 key is pressed for the note length 𝅗𝅥 , followed by the 8 key for the dot. The / key, corresponding to the note B, is then pressed.

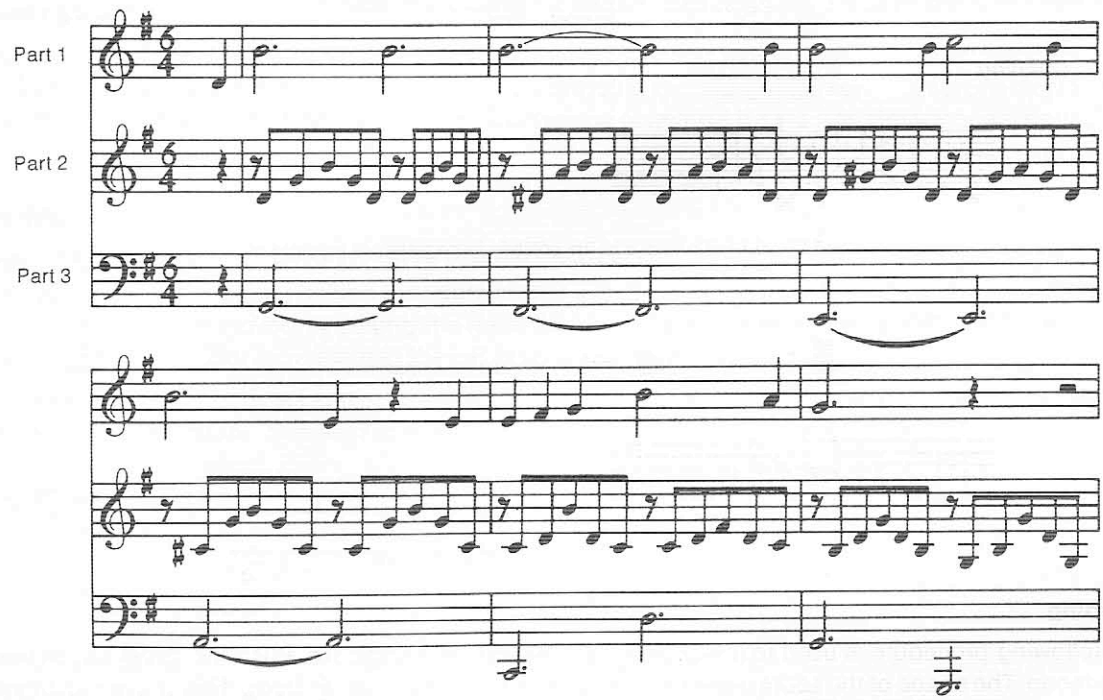
(5) The next note is exactly the same so the / key is pressed again.

(6) The note following this has a tie mark attached to it (the tie mark combines the time values of the notes which it connects). The Y key is pressed for the tie mark followed by the / key. The tie mark is cancelled before entering the second note by pressing the Y key again.

INPUT OF AN ACTUAL SCORE

The following procedure will input the following score and automatically play it back.
The first step is to turn on the power.

Fig. 28 Liebstraume No. 3 by Listz



Part 1

Setting the part

This score is arranged with three parts. Part 1 is entered first. Part 1 is automatically selected when the power is turned ON. Set the input mode to the Command mode. For input on part 1, push the RETURN key.

Setting the key signature

There is one sharp (#) next to the treble clef at the left of the score. This is the key signature, which shows that this piece is in G major. There is no need to mark the sharps for the F notes on this score, since they are already indicated in the key signature at the beginning.

(1) Set the input mode to the Command mode.

(2) Type "key = 1#" and press the RETURN key.

One # will be displayed on the score. (Remember the key signature is only indicated in the treble clef).

Fig. 29 Input of "key = 1#"

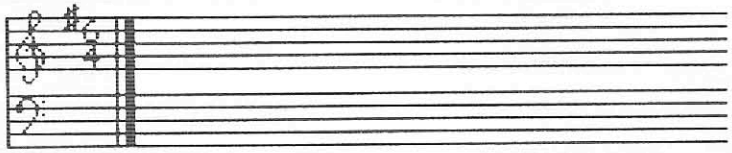
Input of the time signature

The time signature follows the key signature. This piece is in 6/4 time (6 quarter notes/bar). When this time signature is entered into the FM Music Composer, the bars will automatically be located accordingly.

(1) Set the input mode to the Command mode (?).

(2) Type "time = 6/4" and press the RETURN key.
6/4 will be displayed on the score.

Fig. 30 Input of "time = 6/4"



Notes and rests

The next step is to input the notes. Press the SELECT key to switch the input mode to the Note mode. There are various ways to input note and rest data. In the following instructions we describe the method which uses the computer keyboard.

The first note is a D in the C major scale (the C, D, E notes described will be those of the C major scale). This piece starts with an incomplete bar. In other words, the time signature of this piece is 6/4 and thus, there must be notes equal to 6 quarter notes in each bar. However, in this piece there is one quarter note in the first bar. The first bar must, with the FM Music Composer, be completed with rests or the position of the bars will be incorrect. The rests are entered before the notes. In the first bar, there is one quarter note. Therefore, the bar can be completed by entering 5 quarter rests, or equivalently, as shown here, by one whole rest and one quarter rest.

Press the following keys after confirming that the input mode is the Note mode (#).

(1) Enter a whole rest by pressing the 1 key while the SHIFT key is pressed. A whole rest mark 𝄻 will appear on the screen.

(2) Input a quarter rest by pressing the 3 key while the SHIFT key is pressed. If an input error is made, press the DELETE key and re-input the data.

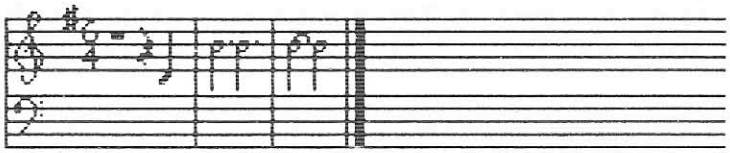
(3) Now it is time for the first note to be entered. Because this is a quarter note, the 3 key is pressed for the note length ♩ as displayed on the menu. The pitch is D so the B key is pressed. A quarter note D will appear on the screen.

(4) The next note is a B dotted half note. The 2 key is pressed for the note length 𝅗𝅥 , followed by the 8 key for the dot. The / key, corresponding to the note B, is then pressed.

(5) The next note is exactly the same so the / key is pressed again.

(6) The note following this has a tie mark attached to it (the tie mark combines the time values of the notes which it connects). The Y key is pressed for the tie mark followed by the / key. The tie mark is cancelled before entering the second note by pressing the Y key again.

Fig. 31 Input of rests and notes



The rest of part 1 is entered in this manner. Pressing the [key will allow the notes to be heard as they are entered.

Playing the piece

The following procedure plays back the composed score.

(1) Press the SELECT key to switch the input mode to the Command mode.

(2) Input either the F5 key or "play" and then press the RETURN key.

Playback should begin after a few seconds. A certain period will pass between the time the RETURN key is pressed and the sound is heard because rests were input at the beginning of the piece. Normally, play begins immediately, assuming there are no rests at the beginning of the score.

Part 2

The next step is to enter part 2.

(1) Type "part = 2" and press the RETURN key. Part 2 will be selected.

(2) Enter the key signature and time signature for part 2, just as you did for Part 1. These must be entered for every part.

(3) Press the SELECT key to switch the input mode to the Note mode.

(4) The input is the same as for part 1. Two dotted half rests are entered, because the first bar is made up entirely of rests. There is a sharp on the D in the third bar. This is entered by pressing the H key. The pitch of the B note in the seventh bar is one octave lower. This is entered by pressing the F key before the note is entered, lowering the cursor by one octave, and then pressing the ' key. The ' key is pressed before entering the next B note, raising the cursor one octave.

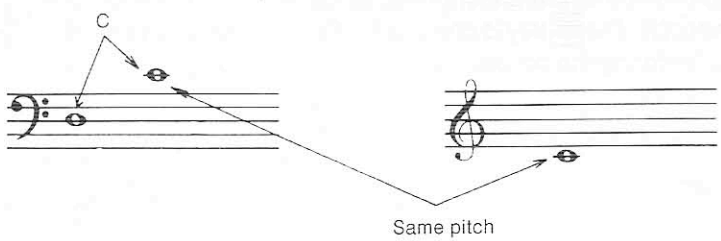
(5) Set the unit to the Command mode after part 2 has been entered and play back the part by pressing F5 and RETURN

Part 3

The final step is to enter part 3. This part is written with the bass clef.

The position of C in the bass clef is shown below.

Fig. 32 Bass clef



The last note will be G but an octave lower than the final G of part 2. The [F] key is pressed to lower the pitch and the note is entered. The final note in the seventh bar is even one octave lower, but pressing the [F] key again will not lower the range. To remedy this, switch to the Command mode and input 1od followed by the [RETURN] key. 1od will be displayed on the score and all notes input after this mark appears will sound one octave lower than the score indicates. Return the input mode to the Note mode and enter a note having the same pitch as the previously input G note.

All of the notes have now been entered. Switch to Command mode. Press [F5] or type "play" and [RETURN] to listen to the piece. The default piano voices will be heard. The voices are the next things to be set.

Setting the voice

Voice setting starts from part 1.

(1) Switch the screen display to part 1 by entering Command mode, pressing [F1], 1, and [RETURN].

(2) Then set the unit to the Note mode. The score cursor will appear on the left edge of the score.

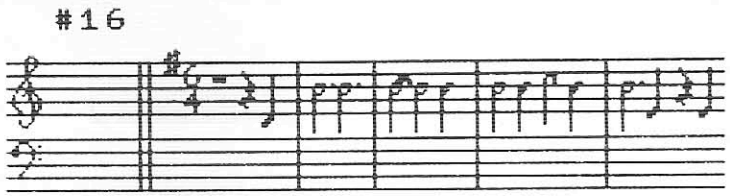
(3) Press the [INS] key and the shape of the score cursor will change from ⁝ (blue) to ⁘ (red). This indicates the insertion mode in which notes and other parameters can be inserted at the position of the score cursor.

(4) Switch the input mode to the Command mode and type " # = 16" followed by the [RETURN] key. #16 will be inserted at the cursor position. This sets the voice of part 1 to flute.

(5) Confirm this by playing the piece (Press [F5] and [RETURN]).

(6) Set parts 2 and 3 to various voices using a similar approach, and listen to them (refer to page 63 for the voice numbers). Actually, if the unit is still in insert mode (red ⁘ cursor), you can press [F1] (part =) and type 2 to select part 2. Then simply type "# = n" where n is the voice number you want for part 2. The same is true for part 3.

Fig. 33 Setting voice



SAVING AND LOADING PERFORMANCE DATA

The score that you have created will be erased if the power is turned off. However, with the FM Music Composer, performance data can be saved onto cassette tape previously connected to the CX5M. And you may load these data again into the computer for playback or editing.

Saving performance data

"Saving" refers to the operation of recording the data contained in the computer memory onto an external device (cassette recorder) Cassette recorder must be connected to the CX5M before turning the power ON.

Saving onto a cassette tape

The csave command is used to save the score (performance data) onto cassette tape.

(1) Load a cassette tape into the cassette recorder.

(2) Set the input mode to the Command mode (?).

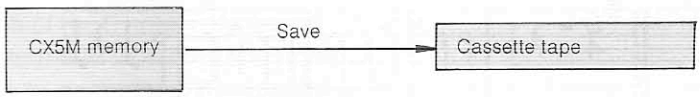
(3) Save the data by inputting "csave = name". The name can be any combination of up to six alphanumeric characters. csave can be entered by pressing the F6 key (SHIFT key + F1 key).

(4) Start recording onto the cassette tape by pressing the RETURN key.

(5) The cassette recorder will stop after the data has been saved (assuming the "remote" jack on the recorder is connected to the CX5M).

★ Carefully indicate in the cassette directory the name of the score as well as the exact location of the score in the tape.

Fig. 34 Saving diagram



Loading performance data

"Loading" refers to the operation of reading into the CX5M memory the data recorded onto an external device (cassette tape or Data Memory Cartridge). These devices must be connected to the CX5M before turning the power ON.

Loading from a cassette tape

(1) Fast forward and rewind operations may not be possible when the cassette recorder "remote" jack is connected to the computer. Remove the "remote" (black) cable from the remote control jack of the cassette recorder when the tape needs to be rewound or fast forwarded. Re-insert the cable after fast forward or rewind operations have been completed.

(2) Set the input mode to the Command mode (?).

(3) Load the suitable data by inputting "cload = name." The name must correspond to the name used for saving the data that you want to load. If you omit the name, the first data found in the tape will be loaded.

(4) Start loading by pressing the RETURN key.

(5) The cassette recorder will stop after the data has been loaded and the begining of the score will be displayed on the screen.

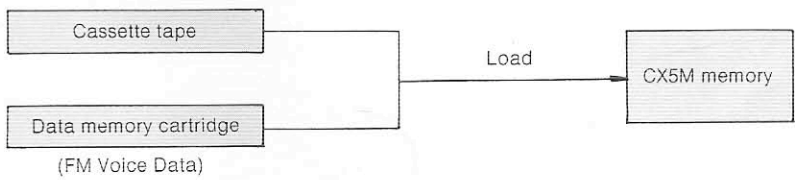
Note:
If the cassette recorder is not correctly connected or if the inputted name does not correspond to a name recorded onto the cassette, loading can not be achieved and you must cancel the command by pressing CTRL + STOP .

Loading FM Voice Data (by YRM-102) from a Data Memory Cartridge

(1) Set the input mode to the Command mode.

(2) Load the data contained in the cartridge by inputting "dcload = VOICE", then press the RETURN key.

Fig. 35 Loading diagram



Back-up copy

It is advisable to make a back-up copy on cassette tape of any cassette tape that has performance data saved on it. This provides an extra copy in case the original copy is damaged.

Creating a cassette back-up copy

(1) Load the data recorded onto the cassette tape (Refer to "***Loading performance***".)

(2) Insert a new cassette into the cassette recorder.

(3) Save the data onto the new cassette tape. (Refer to "**Saving onto cassette tape**".)

★ A back-up copy of an original cassette tape should not be made by dubbing from one cassette recorder to another as this procedure can introduce distorsions of the data and render the new copy unusable.

Fig. 36 Back-up copy diagram

PRINTING OUT THE SCORE

A hard copy can be made of the score (performance data) exactly as it appears on the screen display. Connect the printer to the computer according to the procedure outlined in the instruction manual (use an MSX type printer compatible with the computer).

(1) Select the part to be printed out (Command mode, F1 part no.)

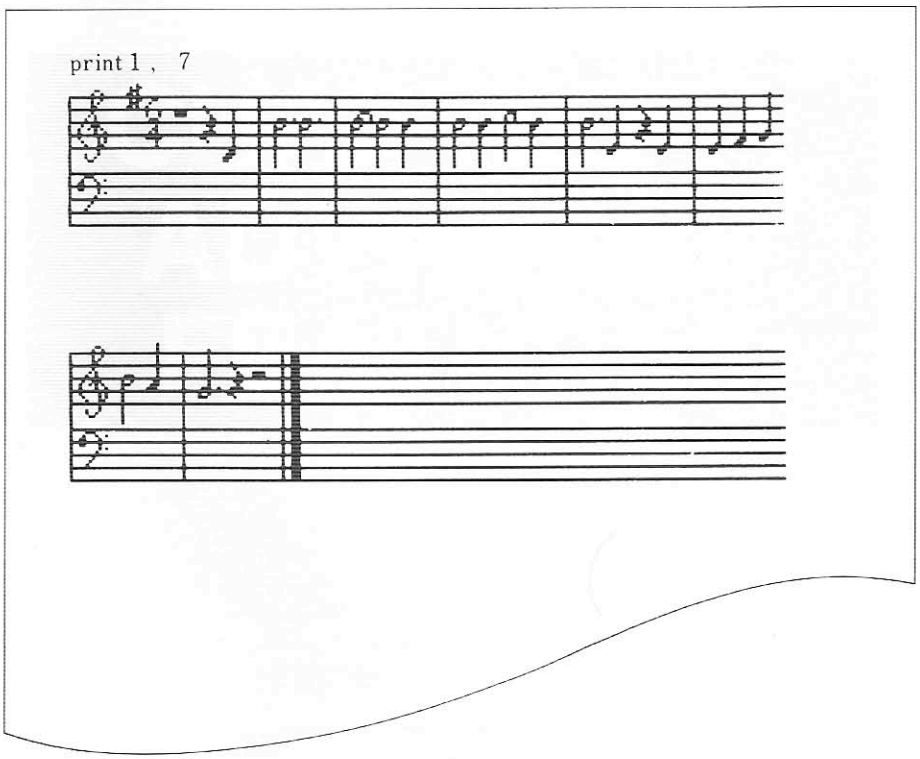
(2) With the computer still in the Command mode, type "print = n,m." n is the first bar to be printed and m is the last bar. Thus, to print out bars 6 through 33 inclusive, type "print = 6,33." "print =" can be entered by pressing F10 (SHIFT + F5).

(3) Press the RETURN key to start the print out process.

★ The print-out is carried out in screen units. Thus, all of the bar last specified which appears in the screen will be printed out.

(4) If the printer is not correctly connected or is not on line, computer will wait indefinitively. To cancel the command, press CTRL + ESC.

Fig. 37 Print out example



CHAPTER IV
ADVANCED FEATURES

Dynamics markings

Dynamics

The markings used to express dynamics are given in the table 2.

Table 2 Dynamics symboles and their preset value

Display	Effect	Preset value
ppp	very weak (pianississimo)	(16)
pp	(pianissimo)	(48)
p	weak (piano)	(80)
mp	moderately weak (mezzo piano)	(112)
mf	moderately strong (mezzo forte)	(144)
f	strong (forte)	(176)
ff	(fortissimo)	(208)
fff	very strong (fortississimo)	(240)

There are two kinds of dynamics setting.

- Using the preset values

Input of the symbols ppp, pp etc. without other specification will set the dynamics according to the preset value of each symbol (see table 2).

(1) Set the input mode to the Command mode.

(2) Enter the desired dynamic mark.

(3) Push the RETURN key to complete the input. The dynamics mark will appear on the score.

- Inputting your own settings

Instead of using the 8 standard music notations from ppp to fff, more precise setting of the dynamics is possible in 255 increments over the range of 1 ~ 255. This is set by the following procedure.

(1) Make sure that the input mode is the Command mode.

(2) Set the value in the form of any dynamics marking followed by an equal (=) sign and the set value (for example, "f = 180").

(3) The dynamics marking and the set value will appear on the score. The preset values are shown in Table 2. Input of the numeric values will determine the dynamics regardless of the dynamics signs entered. For example, input of "f = 5" is the same as "fff = 5" and will provide a level weaker than ppp with no numeric value. In other words, "ppp = 20" ,"mf = 20", and "fff = 20" all produce the same volume effect.

Preset value
(16)
(48)
(80)
(112)
(144)
(176)
(208)
(240)

according to the

on the score.

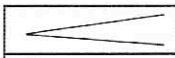
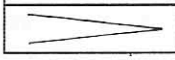
of the dynamics
procedure.

sign and the set

alues are shown
of the dynamics
l provide a level
20", and "fff =

Changes in dynamics

The following markings are normally used to indicate changes in dynamics during the performance of a piece. They can also be used with the FM Music Composer for the same purpose.

	(crescendo) increase volume
	(decrescendo) decrease volume

(1) Set the unit to Note mode and position the score cursor, using the ← and →, to the location where you want the change.

(2) Set the input mode to the Command mode.

(3) Type the change in dynamics by using the < key or the > key plus the = key and a numeric value, according to the following:

< =(n) crescendo
> =(n) decrescendo

n is a number in the range of 1 to 255. The smaller n is, the faster the dynamics change (refer to page 57 for details). If n is omitted, the previously set value for the current part will be used (the default value for n is set to 12 when the part is first set).

(4) Press the RETURN key to complete data input. > or < will appear on the score (and the set value). Refer to NOTE in APPENDIX (p. 64).

Accents

The following markings are used to emphasize certain notes. Each marking will affect only the following note.

An ^ (accent) adds a specified emphasis value to a note when it is played. If the value is omitted, the value already set in that part is used (the initial value is 16).

In sfz (sforzando), the note is played at the set level regardless of the present value. If the value is omitted, the value already set in that part is used (the initial set value of the part is 255, the maximum emphasis).

- Input procedure

(1) Set the input mode to the command mode.

(2) Type the emphasis marking according to the following:

^ = (n)
sfz = (n)

where n is the value of the desired emphasis which is set as needed.

(3) Press the RETURN key to complete the data input. The mark (and set value) will appear on the score.

★ Note that some voices, such as PORGAN 1, 2 etc., will not be affected at all by the accent markings. The above accent parameters cause changes in velocity dynamics. Thus, the set velocity sensitivity value of the voices (as created using the FM Voicing Program) will determined the degree to which these voices are affected by the accents. You can increase the velocity sensitivity of a given voice (using the FM voicing program YRM-103) to increase the sensitivity to changes in accent values (emphasis).

Tempo markings

The tempo markings will affect all parts. Enter them in part 1.

Tempo

- Input procedure

(1) Set the input mode to the Command mode

(2) Input the tempo in the form "tempo = n". The value of n (40 ~ 200) determines the tempo. "tempo =" can be input more quickly than typing by pressing the F9 key (SHIFT + F4 key). n is the number of quarter notes per minute. If "tempo = 60" is input, subsequent performance will have a tempo equivalent to one quarter note per second. The tempo can be changed in the middle of a piece. The default tempo will be ♩ = 120 if another tempo is not set.

(3) Press the RETURN key to complete the input. " ♩ = n" will be displayed on the score.

Changes in tempo

The tempo can be changed during a piece by input of the following markings:

accel	(accelerando) tempo increases
rit	(ritardando) tempo decreases

Refore to NOTE in APPENDIX (p. 64).

- Input procedure

(1) Set the input mode to the Command mode.

(2) Input the change in tempo by entering accel or rit according to the following:
accel =(n)
rit =(n)

n is a number in the range of 1 to 255 which sets the rate of change when necessary. The smaller n is, the faster the tempo changes (refer to page 56 for details).

If n is omitted, the previously set value of the part is used (or the default n is initially set to 12).

(3) Press the RETURN key to complete the data input. The mark will appear on the score (and the set value).

★ To return the tempo to its original setting, enter the command "a tempo".

Fermata

The fermata mark is used to extend a note or rest by stopping the clock during playback.

(1) Set the input mode to the Command mode

(2) Enter the fermata in the form "ferm = n". The value of n (1 ~ 16) determines how long the note or rest is extended. The higher the value, the longer the extension. If the value n is omitted, the previously set value is used. The default value of n is initially set at 4.

(3) Press the RETURN key to complete the input. 𝄐 n will be displayed on the score.

★ The fermata mark temporarily causes the tempo to become 0. If the fermata mark is entered after a note, only the non-voiced part will be extended; the voiced part will not be.

★ The length of extension is n times the denominator of the key signature. For example, if "ferm = 2" is set when the key signature is 3/4, the extension time will be equivalent to two quarter notes.

Performance parameters

Note length is indicated for each individual note. However, when a piece is actually performed, various changes are made in the length of notes. For example, notes may be shortened and cut off from each other (staccato ♩.) or sustained for their full time value (tenuto ♩_). The following parameters allow for changes in expression.

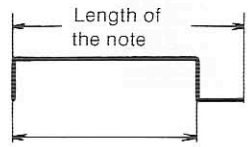
len mark

Notes are normally voiced with the FM Music Composer for about 4/5 of their actual length (n = 200). The length can be changed by the len mark.

- Input procedure

The len mark is entered in the form "len = n". n, which can be from 1 to 255, is the value that determines the voiced portion length. Type len = n and press the RETURN key. Len will be displayed on the score. Setting n to 255 will result in the entire length of the note being voiced. The voiced portion will be about half the note length if n is set to 128.

Fig. 38 Len mark



Setting the ratio of the voiced portion

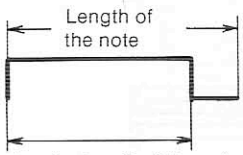
.mark (staccato)

The len mark sets the length of the voiced portion in proportion to the length of the note. The . mark directly sets the length of the voiced portion.

- Input procedure

The . mark is entered in the form ". = n". n is the value which determines the length of the voiced portion. Type ". = n" and press the RETURN key. . n will be displayed on the score. n is a value from 1 to 16 with a quarter note having a length of 24. For example, setting the value of n to 6 will result in a voiced portion equivalent in length to a sixteenth note. This mark sets the length of the voiced portion directly and thus the types of notes have no relation to the length of the voiced portion.

Fig. 39 . mark (staccato)



Setting the length of the voiced portion

Performance parameters

Note length is indicated for each individual note. However, when a piece is actually performed, various changes are made in the length of notes. For example, notes may be shortened and cut off from each other (staccato ♩.) or sustained for their full time value (tenuto ♩_). The following parameters allow for changes in expression.

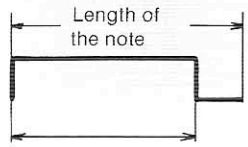
len mark

Notes are normally voiced with the FM Music Composer for about 4/5 of their actual length (n = 200). The length can be changed by the len mark.

- Input procedure

The len mark is entered in the form "len = n". n, which can be from 1 to 255, is the value that determines the voiced portion length. Type len = n and press the RETURN key. Len will be displayed on the score. Setting n to 255 will result in the entire length of the note being voiced. The voiced portion will be about half the note length if n is set to 128.

Fig. 38 Len mark



Setting the ratio of the voiced portion

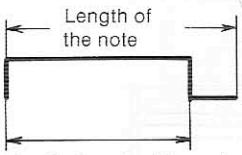
.mark (staccato)

The len mark sets the length of the voiced portion in proportion to the length of the note. The . mark directly sets the length of the voiced portion.

- Input procedure

The . mark is entered in the form ". = n". n is the value which determines the length of the voiced portion. Type ". = n" and press the RETURN key. . n will be displayed on the score. n is a value from 1 to 16 with a quarter note having a length of 24. For example, setting the value of n to 6 will result in a voiced portion equivalent in length to a sixteenth note. This mark sets the length of the voiced portion directly and thus the types of notes have no relation to the length of the voiced portion.

Fig. 39 . mark (staccato)



Setting the length of the voiced portion

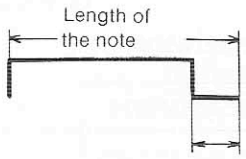
_ mark (tenuto)

The _ mark performs the opposite function of the . mark and directly sets the length of the nonvoiced portion.

● Input procedure

The _ mark is entered in the form "_ = n". n is the value which determines the length of the nonvoiced portion. Type "_ = n" and press the RETURN key. _ n will be displayed on the score. n is a value from 1 to 16 with a quarter note having a length of 24. For example, setting the value of n to 6 will result in the a nonvoiced portion equivalent in length to a sixteenth note. If the note is a quarter note, the voiced portion will be equivalent to a dotted eighth note. If the length of the nonvoiced portion mark is longer than the length of the note, the length of the voiced portion will be set to 1. This mark directly sets the length of the nonvoiced portion; the types of notes have no relation to the length of the voiced portion, which always remains constant.

Fig. 40 _ mark (tenuto)



Setting the length of the nonvoiced portion

★ There is a close relationship between the len mark, the mark, and the _ mark. Input of any one of these will alter the voiced portion length. The voiced portion can be returned to its initial length by inputting the data of "len = 200."

★ The voiced portion occurs, to use the example of a keyboard instrument, while the key is being depressed. With some voices, however, there may be some residual sound output during the non-voiced portion.

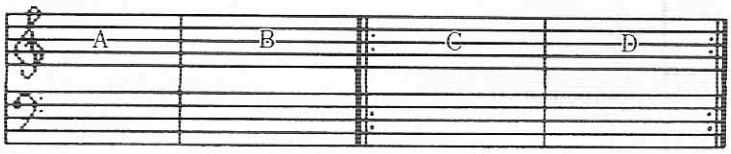
Repeat signs

The following symbols are used to indicate that a certain portion of a piece is to be repeated. This saves both time and memory space since that portion does not need to be entered in the score twice.

Simple repetition

The section between the 𝄆 and 𝄇 signs is repeated.

Fig. 41 Simple repetition



Playback order ABCDCD

- Input procedure

(1) The beginning of the section is marked as "rpb = n ". n (2 ~ 255) is the value which determines the number of times the section is going to be repeated. n can be omitted if the section is only going to be repeated once (played twice). Press the RETURN key to complete input. The 𝄆 (repeat beginning) mark (and repeat number) will be displayed on the score.

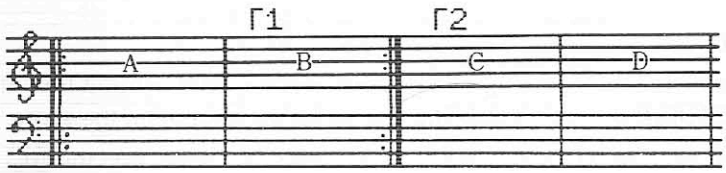
(2) The end of the section is marked "rpe". Press the RETURN key to complete input. The 𝄇 (repeat end) mark will be displayed on the score.

★ "rpb" is an abbreviation for "repeat begin"; "rpe" stands for "repeat end".

Combination of repeat symbols

The 𝄆 and 𝄇 signs which are indicated by 1 and 2 on the score are used when the end of the section to be repeated is different.

Fig. 42 Combination of repeat symbols



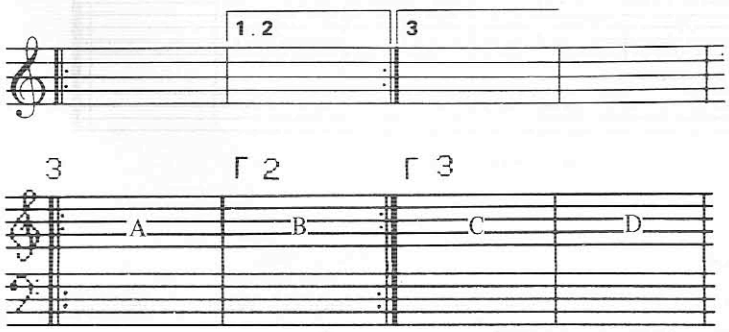
Playback order ABACD

- Input procedure

(1) The bar number to which performance continues is entered in the form "rpn = n". n is in the range of 1 to 255.

(2) Press the RETURN key to complete input. n will appear on the score, above the beginning of the repeat section.

Fig. 43 Example of combination of repeat symbol and corresponding screen display

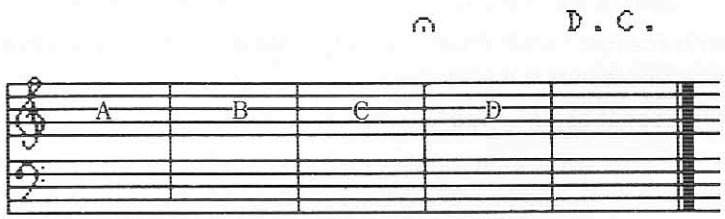


Playback order ABABACD

Da capo (D.C.)

The D.C. mark is used to indicate repeat play from the beginning to the marked section of a piece.

Fig. 44 Da capo



Playback order ABCDABC

Input of the D.C. mark will return performance to the beginning of a piece and stop play at the 𝄐 (fine) mark.

- Input procedure

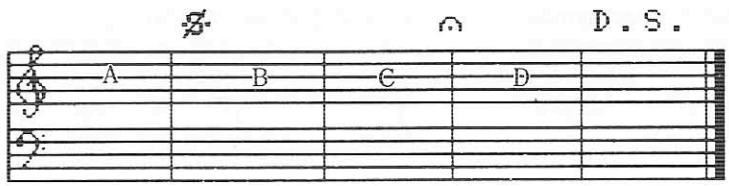
  (1) When a return to the beginning of a piece is desired, dc is entered from the Command mode, and the RETURN key is pressed. The D.C. mark will appear on the score.

  (2) When termination of performance is desired, "fine" is entered and the RETURN key is pressed. The 𝄐 mark will appear on the screen.

Dal Segno

The D.S. mark is used instead of the D.C. mark to indicate the return of play to the marked section rather than the beginning. The mark is the segno 𝄋 . If termination of the performance of a piece is desired, "fine" is entered in the same way as for da capo.

Fig. 45 Dal segno



Playback order ABCDBC

- Input procedure

  (1) The segno 𝄋 mark is entered by typing "segno". When the RETURN key is pressed, the 𝄋 mark will appear on the score.

  (2) When a return to the 𝄋 mark is desired, type ds and press the RETURN key. The D.S. mark will appear on the score.

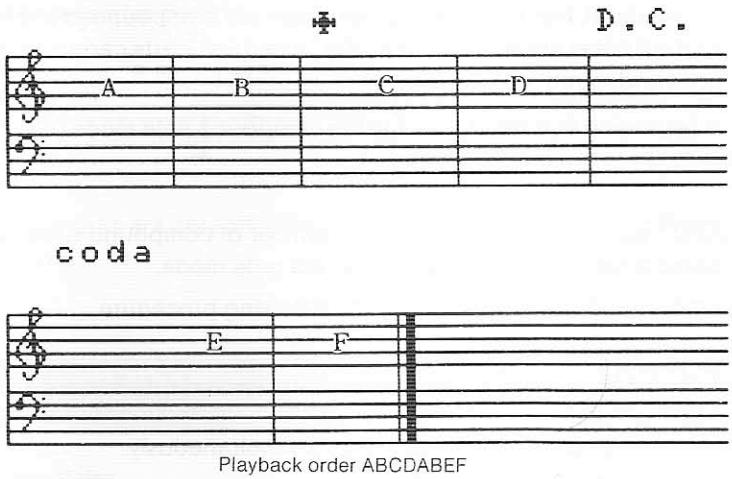
  (3) When termination of play is desired, type "fine" and press the RETURN key. The 𝄐 mark will appear on the screen.

  ★ Playback will return to the beginning of the piece if the segno 𝄋 mark is not input.

Coda

The position from which play begins after the appearance of the D.C. or D.S. sign is indicated by the 𝄌 mark. Playback goes from this section to the one indicated by the coda mark.

Fig. 46 Coda



Playback order ABCDABEF

- Input procedure

  (1) When input of 𝄌 is desired, "to coda" is typed and the RETURN key is pressed. The 𝄌 mark will appear on the score.

  (2) When input of the coda 𝄌 is desired, coda is entered and the RETURN key is pressed. The coda mark will appear on the score.

COMPOUND NOTE INPUT

Setting the compound note mode

The FM Music Composer is normally operated with single notes in each part. The following procedure allows for simultaneous entry of up to eight notes per part (compound note mode). This is useful for the input of chords. The FM Sound Synthesizer unit is capable of generating eight notes at one time; however, the number of available parts decreases by one for every compounded note. The parts are used up in descending order from part 8. For example, if three notes are compounded in part 1, only parts 1 ~ 6 then remain. Even if the 3 notes appear just once, the " used up" parts cannot be accessed because Part 1 is set in the conpound mode.

The poly mark is entered at the beginning of a part to set it to the compound note mode. The poly mark is entered from the Compound mode in the following form:

poly = n (n = 2~8)

The F3 key can be used to input "poly =" and the maximum number of compound notes is entered as n. The RETURN key is pressed to set the part to the compound note mode.

Compound notes are input in the compound note mode by the following procedure.

Entering compound notes

The following procedure sets the notes which will be played back simultaneously.

The first step is to select the mark from the menu (by the menu cursor or by pressing the U key). Subtract one note from the several notes to be played together and enter them in sequence (less the note subtracted) in this way. First, type U in Note mode to set . When is set, the input notes will have a different shape, being displayed as .

Type the notes (except one) and release the mark by typing U again. Then enter the remaining note. In the example shown in Fig. 47, is first set and C and E are entered. Next, is released and G is then entered. The order in which the notes are input is not important.

Fig. 47 Compound notes and their input

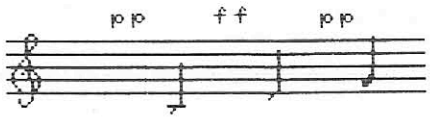
★ Simultaneous performance of more notes than are set by the poly mark is not possible. Be sure not to exceed this number.

★ Rests are not used in the polyphonic note input mode.

Setting dynamics

The reason notes are not displayed together on the score in the polyphonic note mode is that the dynamics of each individual note can be altered. Fig. 48 shows the procedure for emphasizing the quarter notes which make up the melody.

Fig. 48 Use of dynamics markings with compounded notes

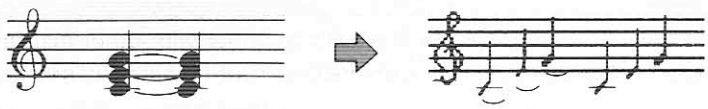


The ^ and sfz marks are only effective for the note directly following the mark even if the notes happen to be compound.

Setting of ties

The input of ties for compound notes is shown in the following diagram.

Fig. 49 Setting of ties



Sustain

The sustain function can be used with parts set to the polyphonic note mode. The sound of single notes is cut off the instant the next note sounds, preventing the sustain function from operating. The polyphonic note mode must be used when the sustain effect is desired.

The sustain function is set from the command mode as follows.

sus = n (n = 1 ~ 15)

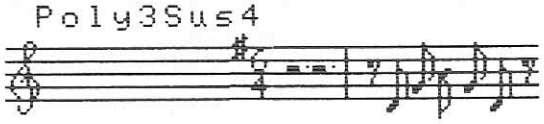
Type "sus = n", and press the RETURN key. The smaller the value of n, the longer the sustain will last. Conversely, the larger n is, the shorter the sustain will be.

★ Input "sus = 0" to release sustain.

Let us try adding sustain to the performance data for Listz's "Liebestraume" which was created in the chapter 3.

The piece can be improved by adding sustain to part two. Switch to part 2 and type "poly = 3" to set the part to the 3 note polyphonic mode. Try setting poly sustain by typing "sus = 4". Now play back the piece.

Fig. 50 Input of the sus mark



Add sustain to the melody of part 1 in the same way. Input "poly = 2" and "sus = 5".

Transposing

The score can be transposed and played back. There are two transposition methods: one transposes all parts simultaneously and the other is used to transpose parts individually.

Transposing all parts simultaneously

The mtra mark (master transposition) is used to transpose all parts. The following is entered in part 1:

mtra = n

The value of n sets the degree of transposition, and can be set in semitone steps over the range of −24 to 24.

Separate transposition of parts

The tra mark is used to transpose each part separately. The part to be transposed is selected and the following is entered:

tra = n

The value of n sets the degree of transposition, and can be set in semitone steps over the range of −24 to 24.

Tune

The tune mark is used for fine tuning when the piece is played together with other instruments. The pitch can be raised or lowered by a maximum one-half of a semitone. Part 1 is selected and the following is entered:

tune = n

Input the required value of n and press the RETURN key. The value of n can be from −127 to 127 and the maximum value will cause a pitch change equal to approximately one-half of a semitone. If the mtra mark is set after the tune mark, the tuning effect will be cancelled.

Volume

This parameter allows the overall volume of each part to be adjusted separately, and is useful for adjusting the balance between parts.

The following is entered:

vol = n

Set the part you wish to adjust, type "vol = n", and press the RETURN key. n is in the range of 0 to 255. The volume is loudest when n is equal to 255.

The default volume of all parts is set to 255 when the power is turned on.

The volume parameter does not affect the velocity, but simply adjusts the volume.

EDITING

Editing refers to the input, as well as the deletion and insertion, of notes and rests. The setting of the parts, deletion, and insertion were outlined in the chapter 3. This section will describe other editing functions.

The setting of bars

When the score is being edited, the section to be edited can be displayed on the screen by scrolling with the cursor. However, if the piece is long, a great deal of time may be required to display the desired section by moving the cursor. Setting the bar by using the bar command is a convenient short cut. The input of this command causes the specified bar to be displayed immediately at the beginning of the screen.

This command takes the following form:

bar = n

In the Command mode, following the entry of "bar =" (simply press the F2 key), type the bar number n to be displayed and press the RETURN key. The bar number n indicates which bar (from the beginning of the part specified) will be displayed.

Deleting data (Clearing notes and voices)

The clear command is used to clear a part of all data. This command takes the following form:

clear = n

Type "clear =" in the Command mode followed by the part where data is to be deleted. The display will switch to the corresponding part when the RETURN key is pressed.

The loaded voice data can be deleted by entering VOICE instead of the part number. If the part number is omitted and only "clear =" or "clear" is entered, the data of all parts as well as all voice data will be deleted when the RETURN key is pressed. The system will then return to the initial "power-on" state.

Copying data

The copy command is useful when entering data identical to that which has already been entered. This command allows data to be easily copied, resulting in a considerable savings of time and effort. Copying is carried out in bar-length units, and can be done between or within parts. The first step is to make note of the biginning and end bars of the data you wish to copy. Then enter Command mode and select the target part (type part = n, RETURN into which the data will be copied.). The input position is then set with the score cursor by switching to note mode. The next step is to go back to Command mode and enter the copy data in the following form:

copy = p, s, e

The part number p of the data to be copied is entered after "copy =" (which can be entered directly by pressing only F4) followed by s, the number of the first bar, and e, the number of the last bar (p = part, s = start, and e = end). The respective values are delimited (separated) by commas (","). Press the RETURN key to copy the specified data beginning with the location specified by the cursor. For example, if copy = 1, 1, 5 is entered when part 2 is selected, the data contained in bars 1 to 5 of part 1 will be copied into part 2.

Note: if the data is to be copied to the middle of an already-entered part, first change the score cursor from ⁜ (blue) to the ✣ (red) insertion cursor to allow data to be inserted in the specified location. Copying can be interrupted while in progress by pushing the STOP key while holding down the CTRL key. Copying will stop the instant the key is pressed.

Playback

Although the use of the play command to start performance operations has already been explained, this section will describe the function in greater detail.

Play command

The desired part can played by entering the part number after "part = " followed by the RETURN key. This is useful for checking each part. The tempo signs are normally entered in part 1 and therefore, the tempo during the performance of the other parts will have different values, (specifically the initial value (= 120)). This can make the individual parts difficult to check. If this turns out to be a problem, a tempo mark can be temporarily set for each and then deleted after each has been checked.

If "t" is entered instead of the part number (i.e. play = t), performance of the part displayed on the screen will begin from the position indicated by the cursor; all parameters to the left of the cursor will be ignored. In the polyphonic note mode, for example, chords will not be played if the score cursor is to the right of the poly mark when you type "play = t" and press RETURN.

Interrupting performance

Playback can be interrupted by pressing the STOP key while holding down the CTRL key. Playback will cease and the unit will enter the Command mode.

Loop command

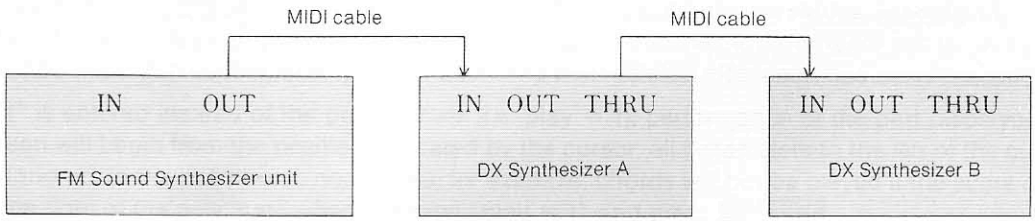
Pressing the RETURN key after typing "loop" will repeat play until the CTRL and STOP keys are pressed. Parts cannot be designated in the same way as the play command; all parts play with the "Loop" command.

CHAPTER V
ADDITIONAL FUNCTIONS

Automatic sequencing of other instruments

Automatic sequencing (auto performance) of MIDI compatible instruments such as Yamaha's DX line of synthesizers etc., is possible with the FM Sound Synthesizer unit. Different instruments can be assigned to each part. The FM Sound Synthesizer and the other instruments are connected together by a MIDI cable (sold separately) as the following diagram shows.

Fig. 51 MIDI connection



The THRU jack is used, as shown above, when more than one additional instrument is connected.

The first step in setting automatic MIDI performance is to select the part. The MIDI channel on which that part will be transmitted is then set by the following:

mdon = n

where n is the MIDI transmission channel (1 ~ 16). Input of this command will result in all subsequent performance data of the part being output on channel n; the data will be automatically played by any MIDI instrument set to receive on channel n. For example, when instrument A, shown in Fig. 51, is set to reception channel 1 and instrument B is set to channel 2, entering mdon = 1 for part 1 and mdon 2 for part 2 will result in the contents of part 1 being performed by instrument A and the contents of part 2 being performed by instrument B. The voices used are set on the instruments actually being played, not with the CX5M.

MIDI output can be stopped by entering "mdoff". This allows only the desired parts to be output on the MIDI channels. The FM Sound Synthesizer will play simultaneously with the other instruments. The sound of the FM Sound Synthesizer can be eliminated by entering the "sfgoff" command. Entering "sfgon" will restore the sound output of the FM Synthesizer unit.

Single byte output to MIDI

One byte of data can be output to MIDI. This is set by the following:

sm = n

where n specifies the data, and is in the range of 0 to 255. See the MIDI reference material to determine the data contents. The following example is used to change the voice of the DX Synthesizer. The format for the program changes is as follows. Two bytes of data are required.

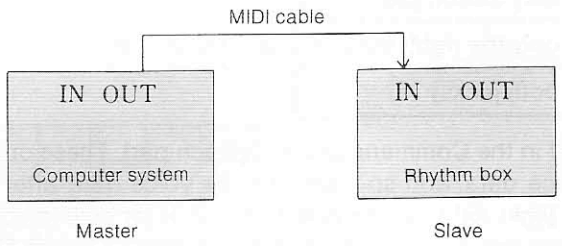
1100nnnn (n = 0; ch1)
0ppppppp (p = 0; Voice 1)

The first byte will send the program change code 192 (binary 11000000 converted to a decimal number) added to the channel number minus one. The second byte sends a value equivalent to the voice number minus one. For example, to change the voice of the DX Synthesizer receiving on MIDI channel 1 to voice number 5, enter "sm = 192" followed by "sm = 4".

Synchronized MIDI performance

Synchronized performance is possible using MIDI compatible rhythm boxes having a synchronization feature. Connections are by the MIDI cable as shown in the following diagrams.

Fig. 52 Connection diagram for synchronized performance



★ The FM Sound Synthesizer unit and the FM Music Composer connect to the system via the MIDI jack on the FM Synthesizer unit.

Enter the "msst" command at the beginning of part 1. The play command will then start the performance.

The performance can be stopped by entering the "msoff" command in part 1.

Output selection

The FM Sound Synthesizer unit has stereo output jacks allowing voices to be assigned to the left output, right output, or both. Voices contained in the FM Sound Synthesizer are normally output from both the right and left output jacks. The following commands allow this to be changed.

outl	(output from only the left jack)
outr	(output from only the right jack)
outc	(output from both jacks)

These commands can be entered in the Command mode for each part. These output selection commands are considered to be voice data, and so changing the voice data after the input of these commands will select the output jacks set by that voice (both L & R for built-in voices of the FM Synthesizer unit, and whichever output jacks were set for the voices created by the FM voicing Program YRM-102).

Changing LFO data

The LFO (Low Frequency Oscillator) is an oscillator used to generate low frequencies, which are used to modulate pitch and amplitude, thereby creating vibrato and tremolo effects. There are various parameters which can be set independently for each voice. These are controlled by the following commands.

wf

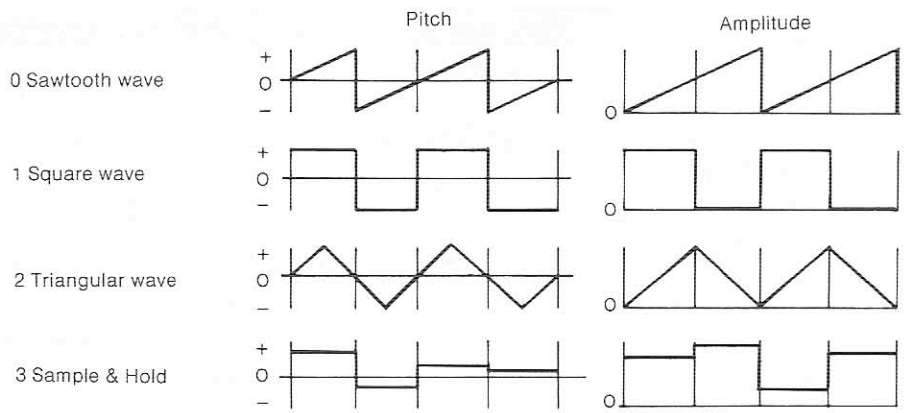
This command changes the waveform of the LFO (modifies the vibrato and tremolo effects)

The form is

wf = n

The waveform number, n, is entered after typing "wf=". The value of n is from 0 to 3. The various waveforms corresponding to the values are shown in Fig. 53.

Fig. 53 Envelop shapes



Sample & Hold outputs random values.

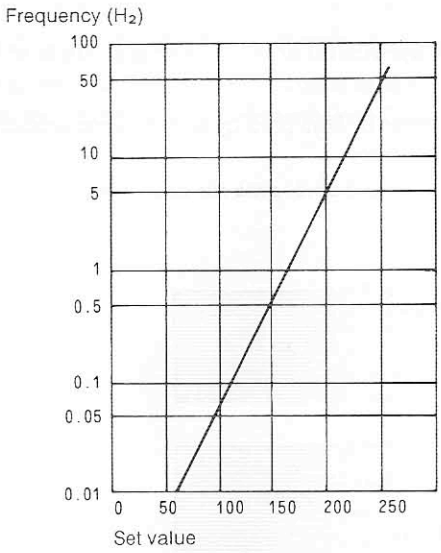
lf (LF)

This command changes the rate (frequency) of the LFO. The frequency can be changed over an approximate range of 0.008Hz to 53Hz. The form is

lf = n

where n is the value which determines the frequency. n can be between 0 and 255. The higher the value of n is, the higher the frequency will become, and the faster the rate of modulation.

Fig. 54 Relationship between the frequency and the set value



amd

The following command is used to change the amount of amplitude modulation depth:

amd = n

where n is the value for determining the depth. n can be between 0 and 127. The higher the value of n is, the higher the output level (although the voice's ams, or amplitude modulation sensitivity, will also determine the effect of this amd setting.)

pmd

The following command is used to change the amount of pitch modulation depth:

pmd = n

where n is the value for determining the depth. n can be between 0 and 127. The higher the value of n is, the higher the output level (although the voice's pms, or pitch modulation sensitivity, will also determine the audible effect of the pmd setting.)

★ These four commands (wf, if, amd, and pmd) are used for setting all parts at the same time. If they are used on any one part, all of the other parts will be affected. Also, if the voice is changed after the input of these values, the newly set value will apply regardless of which part it was entered on. There are some voices which will not change (those with ams or pms values of zero).

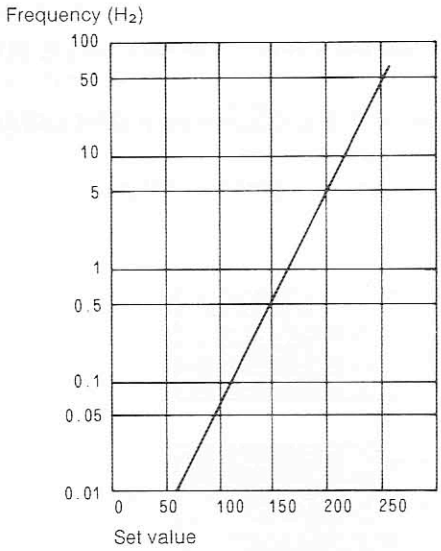
lf (LF)

This command changes the rate (frequency) of the LFO. The frequency can be changed over an approximate range of 0.008Hz to 53Hz. The form is

lf = n

where n is the value which determines the frequency. n can be between 0 and 255. The higher the value of n is, the higher the frequency will become, and the faster the rate of modulation.

Fig. 54 Relationship between the frequency and the set value



amd

The following command is used to change the amount of amplitude modulation depth:

amd = n

where n is the value for determining the depth. n can be between 0 and 127. The higher the value of n is, the higher the output level (although the voice's ams, or amplitude modulation sensitivity, will also determine the effect of this amd setting.)

pmd

The following command is used to change the amount of pitch modulation depth:

pmd = n

where n is the value for determining the depth. n can be between 0 and 127. The higher the value of n is, the higher the output level (although the voice's pms, or pitch modulation sensitivity, will also determine the audible effect of the pmd setting.)

★ These four commands (wf, if, amd, and pmd) are used for setting all parts at the same time. If they are used on any one part, all of the other parts will be affected. Also, if the voice is changed after the input of these values, the newly set value will apply regardless of which part it was entered on. There are some voices which will not change (those with ams or pms values of zero).

ams

The following command is used to change the sensitivity of the part (voice) to amplitude modulation.

ams = n

where n is the value for determining the sensitivity. n can be between 0 and 3. The sensitivity is at the maximum level when n is 3.

pms

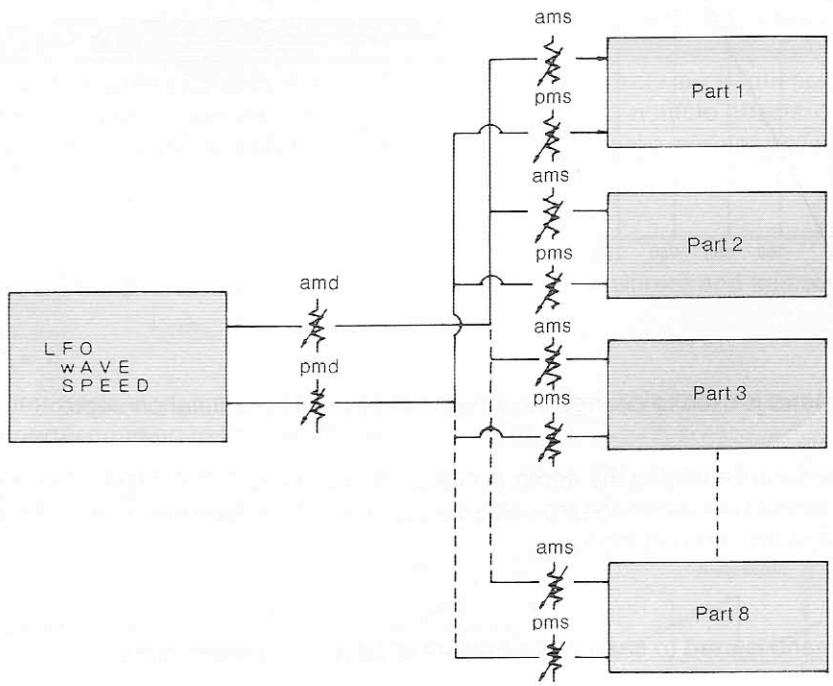
The following command is used to change the sensitivity of the part (voice) to pitch LFO.

pms = n

where n is the value for determining the sensitivity. n can be between 0 and 7. The sensitivity is at the maximum level when n is 7.

★ No pitch modulation can be applied when either pmd or pms is 0. This also applies to amd and ams.

Fig. 55 Block diagram showing the relationship between amd, pmd and ams, pms for each part



Performing from the keyboard

Connect the Yamaha Music Keyboard (YK-01 or YK-10) to the FM Sound Synthesizer and that music keyboard can be used to play along with the FM music composer, by entering the following commands:

mkon	allows the keyboard to be played
mkoff	stops the performance from the keyboard

When it is desired to play from the keyboard, set one part aside for the keyboard and enter the "mkon" command in this part. The voice is determined by the values set for that part. A portion of a part can be used for the keyboard as well.

When entering the "mkon" command, use the form "mkon =," where the value n determines the note volume (velocity). n is between 0 and 255. The higher the value of n, the higher the volume.

CHAPTER VI
APPENDIX

TABLES OF SYMBOLS (COMMANDS)

Symbols and signs used dor creating scores

Pitch markings

Symbol & Command	Function	Input example (set value)	Display example	Reference page
1 od (1 octave down)	lowers the pitch of the notes by one octave	1 od	10d	19
1 ou (1 octave up)	raises the pitch of the notes by one octave	1 ou	10u	19
2 od (2 octaves down)	lowers the pitch of the notes by two octaves	2 od	20d	19
2 ou (2 octaves up)	raises the pitch of the notes by two octaves	2 ou	20u	19
loco (loco)	release the pitch setting mode	loco	loco	19

Tempo markings

Symbol & Command	Function	Input example (set value)	Display example	Reference page
accel (accelerando)	gradually raises the tempo	accel=3 (1～255)	accel3	36
atempo (atempo)	returns the tempo to its original setting	atempo	atempo	36
fermata (fermata)	extends the note or rest	ferm=3 (1～16)	𝄐3	36
rit (ritardando)	gradually slows down the tempo	rit=5 (1～255)	rit5	36
tempo (tempo)	sets the tempo	tempo=140 (40～200)	♩=140	36

Display example	Refer-ence page
10d	19
10u	19
20d	19
20u	19
loco	19

Display example	Refer-ence page
ccel3	36
tempo	36
∩3	36
·it5	36
=140	36

Dynamics markings

Symbol & Command	Function	Input example (set value)	Display example	Refer-ence page
< (crescendo)	gradually increases volume	<=5 (1~255)	<5	35
> (decrescendo)	gradually decreases volume	>=5 (1~255)	>5	35
^ (accent)	emphasizes only one note (relative value)	^=20 (1~255)	^20	35
sfz (sforzando)	emphasizes only one note (absolute value)	sfz=100 (1~255)	sfz100	35
ppp (pianississimo)	very quiet	ppp (1~255)	ppp	34
pp (pianissimo)	very quiet	pp (1~255)	pp	34
p (piano)	quiet	p (1~255)	p	34
mp (mezzo piano)	moderately quiet	mp (1~255)	mp	34
mf (mezzo forte)	moderately loud	mf (1~255)	mf	34
f (forte)	loud	f (1~255)	f	34
ff (fortissimo)	very loud	ff (1~255)	ff	34
fff (fortississimo)	very loud	fff (1~255)	fff	34

Performamce parameters

Symbol & Command	Function	Input example (set value)	Display example	Refer-ence page
. (staccato)	sets the length of the voiced section	.=5 (1~16)	.5	37
_ (tenuto)	sets the length of the unvoiced section	_=5 (1~16)	_5	38
len (length)	sets the voiced to unvoiced ratio	len=100 (1~255)	L100	37

Repeat signs

Symbol & Command	Function	Input example (set value)	Display example	Reference page
coda (coda)	designates part to where performance will jump from 𝄌 mark	coda	coda	41
dc (da capo)	return to the beginning of the piece	dc	D.C.	40
ds (dal segno)	return to 𝄋 mark	ds	D.S.	40
fine (fine)	sets position of ending that follows repetition of sections marked with D.C or D.S.	fine		40
rpb (repeat begin)	sets beginning of section to be repeated and number of repetitions	rpb=4 (2~255)		39
rpe (repeat end)	sets end of section to be repeated	rpe		39
rpn (repeat number)	sets Γ1,Γ2 etc	rpn=1 (1~255)	Γ1	39
segno (segno)	sets position to return to with D.S. sign	segno	𝄋	40
to coda (to coda)	sets coda position to be moved to following repetition ofsections marked with D.S. or D.C. signs	tocoda	𝄌	41

Other parameters

Symbol & Command	Function	Input example (set value)	Display example	Reference page
key (key)	sets the key signature	key=2 #		14
time (time)	sets the time signature	time=3/4		16

isplay ample	Refer-ence page
oda	41
.C.	40
.S.	40
	40
4.	39
	39
T1	39
	40
	41

play mple	Refer-ence page
	14
3 4	16

Parameter controlling tone generation system etc.

LFO control

Symbol & Command	Function	Input example (set value)	Display example	Refer-ence page
amd	changes level of amplitude modulation	amd=30 (0~127)	Amd30	51
ams	changes sensitivity to amplitude modulation independently for each part	ams=3 (0~3)	Ams3	52
lf (LFO frequency)	changes frequency of LFO	lf=200 (0~255)	LF200	51
pmd	changes level of pitch modulation	pmd=30 (0~127)	Pmd30	51
pms	changes sensitivity to pitch modulation independently for each part	pms=3 (0~7)	Pms3	52
wf (waveform)	changes waveform of LFO	wf=2 (0~3)	WF2	50

Output jack control

Symbol & Command	Function	Input example (set value)	Display example	Refer-ence page
outc (out center)	sets output to both left and right jacks	outc	OutC	50
outl (out left)	sets output to left jack	outl	OutL	50
outr (out right)	sets output to right jack	outr	OutR	50

MIDI control

Symbol & Command	Function	Input example (set value)	Display example	Refer-ence page
mdon (MIDI on)	starts output of performance data to MIDI terminal and sets transmission channel	mdon=1 (1~16)	MDon1	48
mdoff (MIDI off)	stops output of performance data to MIDI terminal	mdof	MDoff	48
sm (send MIDI)	outputs one byte of data to MIDI	sm=192	Sm192	48

Synchronized performance

MIDI

Symbol & Command	Function	Input example (set value)	Display example	Reference page
msoff (MIDI sync off)	stops transmission of synchronization signals from MIDI terminal	msoff	MSoff	49
msst (MIDI sync start)	starts MIDI synchronization	msst	MSst	49

Editing and performance parameters

Editing and printing

Symbol & Command	Function	Input example (set value)	Reference page
bar	sets bar to be displayed on screen	bar=25 (1 – number of input bars)	45
clear	deletes data	clear=2 (1 ~ 8, VOICE)	45
copy	copies performance data	copy=1, 6, 8	45
part	sets part to be displayed on screen	part=6 (1 ~ 8)	14
print	prints the scores on paper (printer)	print=6, 8	31

Playbak

Symbol & Command	Function	Input example (set value)	Reference page
loop	start repeat performance	loop	46
play	starts performance	play (1 ~ 8, t)	46

Voice generation system control

Symbol & Command	Function	Input example (set value)	Display example	Reference page
sfgon (sfg on)	turns on voice generation system of FM Sound Synthesizer	sfgon	SFGon	48
sfgoff (sfg off)	turns off voice generation system of FM Sound Synthesizer	sfgoff	SFGoff	48

Music keyboard control

Symbol & Command	Function	Input example (set value)	Display example	Reference page
mkon (mk on)	allows performing on music keyboard	mkon=200 (0~255)	Mkon200	53
mkoff (mk off)	prevents performing on music keyboard	mkoff	Mkoff	53

Additional parameters

Symbol & Command	Function	Input example (set value)	Display example	Reference page
# (number)	sets voice	#=6 (1~96)	#6	21
mtra (master transposer)	transposes all parts	mtra=3 (−24~24)	M+3	44
poly (poly)	sets polyphonic note mode	poly=3 (2~8)	Poly3	42
sus (sustain)	sets sustain	sus=5 (0~15)	Sus5	43
tra (transpose)	transposes individual parts	tra=3 (−24~24)	+3	44
tune (tune)	fine tunes the pitch	tune=30 (−127~127)	Tune+30	44
vol (volume)	sets volume balance of each part individually	vol=220 (0~255)	V220	44

Saving and loading performance data

Symbol & Command	Function	Input example (set value)	Reference page
cload	loads voice performance data from cassette tape	cload = (file name)	29
csave	saves performance data onto cassette tape	csave = (file name)	28

Loading voice data

Symbol & Command	Function	Input example (set value)	Reference page
cload = VOICE	Loads voice data from cassette	cload = VOICE	21
dcload = VOICE	loads voice data from data memory cartridge	dcload = VOICE	21

value)	Refer-ence page
	29
	28

value)	Refer-ence page
	21
	21

TABLE OF VOICES

This table lists internal voices of the FM Sound Synthesizer unit.
Use the voice number when setting the voices with the FM Music Composer.

1 Bright brass
2 Sonorous brass
3 Trumpet
4 Sonorous strings
5 Real strings also suited for the playing of single notes
6 Electronic piano 1
7 Electronic piano 2
8 Electronic piano 3
9 Mild guitar
10 Funky electric bass
11 Mild electric bass
12 Electric organ 1
13 Electric organ 2
14 Majestic pipe organ
15 Small pipe organ
16 Flute
17 Piccolo
18 Oboe
19 Clarinet
20 Glockenspiel
21 Vibraphone
22 Xylophone
23 Koto
24 Zitar
25 Funky clavinet
26 Harpsicord
27 Bell
28 Harp
29 Short notes are bell, long notes are brass
30 Harmonica
31 Steel drum
32 Timpani
33 Train
34 Ambulance
35 Chirping of a small bird
36 Sound of raindrops
37 Brass
38 Flute
39 Guitar
40 Horn
41 Funky electric bass
42 Mild electric bass
43 Snare drum
44 Cow bell
45 Percussion 1
46 Percussion 2
47 CSM Reserved for future applications
48 (there will be no sound output when the FM Music Composer is used)

NOTE: Changes in the < . > . accel . and rit signs

The shortest note which the FM Music Composer can handle is 𝅘𝅥𝅯, which is equivalent to 1/96 of a whole note. The intensity and tempo of the < , > , accel, and rit signs, will change by one for each progression of 𝅘𝅥𝅯 multiplied by the set value. For example, if < = 2 is set, the volume will be intensified by one step for every two 𝅘𝅥𝅯 notes and twelve steps for every quarter note. To calculate the set value from the desired variation in value per every quarter note, divide 24 by the amount of variation. For example, if the tempo is to be slowed down by a factor of six for every quarter note, set rit = 4.

★ The intensity stops changing when another dynamics marking is encountered or when either the maximum or minimum value is reached.

★ The tempo stops changing when another tempo marking is encountered or when either the maximum or minimum value is reached.

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