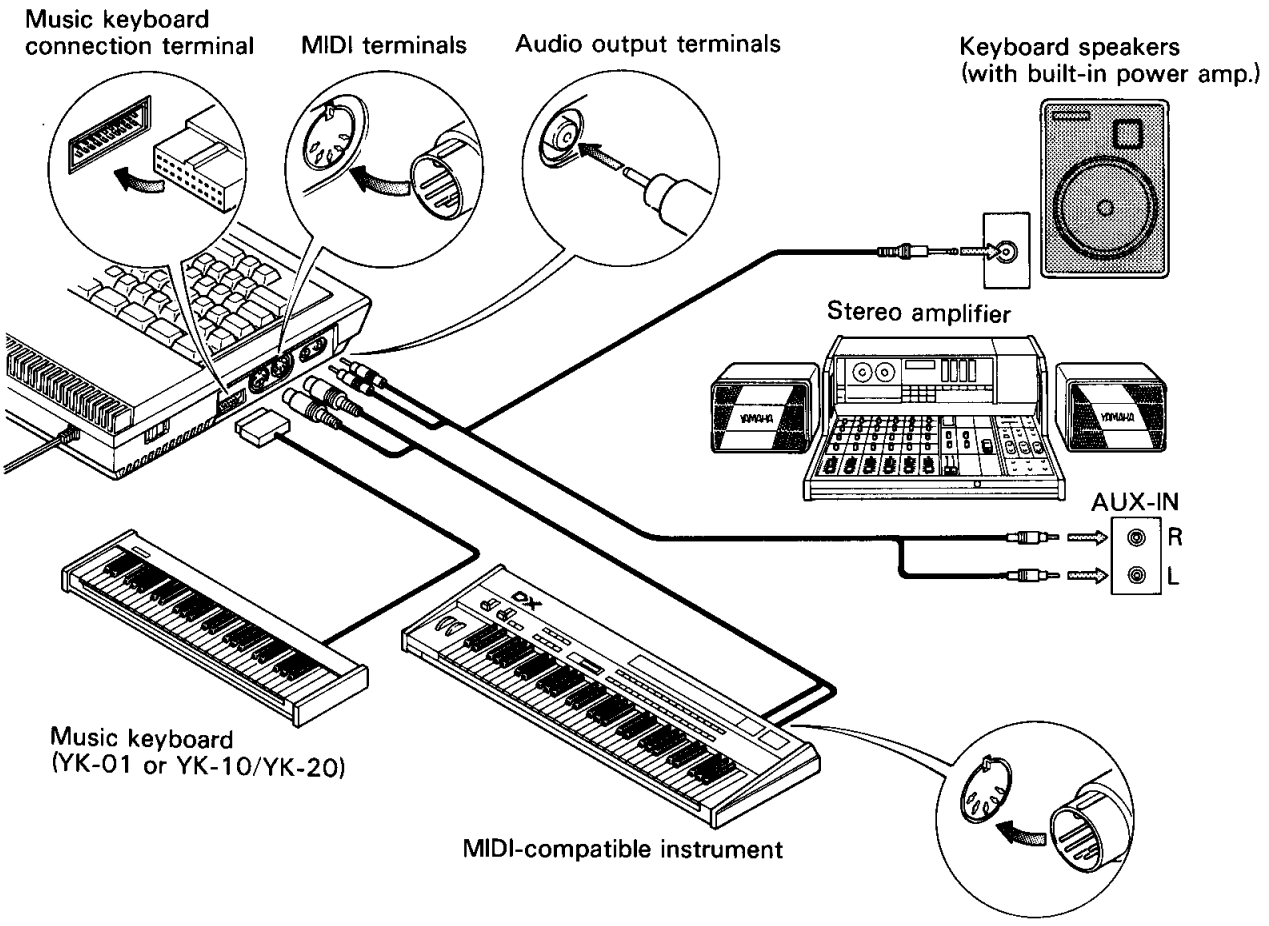
# FM SOUND SYNTHESIZER UNIT

# *INTRODUCING THE SFGII*

The SFGII is an FM tone generator unit that plugs into the slide slot of an MSX computer. When used with a Yamaha Music Keyboard (YK-01, YK-10, YK-20; not included) or MIDI keyboard, it transforms your MSX into a digital synthesizer with wide possibilities. Here are some things you can do with the SFGII.

- Play a solo voice with rhythm and Auto Bass Chord accompaniment.
- Play up to 8 notes polyphonically with 1 or 2 voices (4 voices if you use a MIDI keyboard).
- Real time recording and playback of up to 1800 notes. (You can play chords, too.)
- Connect to an external MIDI sequencer or rhythm machine and use as a 4-voice, 2-note MIDI tone generator. You can set MIDI reception channels independently for each voice.
- By using the YRM-101 Music Composer software (sold separately), you can play up to 8 different voices simultaneously.
- Yamaha music software YRM-101 ~ 104 will run with no problems on the new SFGII. However, the playback tempo for the Music Composer (YRM-101) and Music Macro (YRM-104) may be a bit slower than if used with the SFG-01 (built-in FM Tone Generator of CX5M.)

# SYSTEM SETUP AND CONNECTIONS




NOTE:

1. The CX5MII has built-in preamplifier circuitry, allowing you to connect the output of the FM Sound Synthesizer unit II directly to a video monitor "audio signal" input terminal. The signal is then monitored via the built-in TV or video monitor speaker. The audio signal is output from the CX5MII via the rear-panel jack.
   Please note that the FM Sound Synthesizer output has very high dynamic range and the sound will most likely be distorted when monitored through a built-in TV speaker. Output volume should be lowered when monitoring the signal in this way.

2. For better sound reproduction quality the FM Sound Synthesizer unit II can be connected directly to a stereo or keyboard amplifier. RCA pin-type audio output terminals are found on the left hand side of the CX5MII. This allows you to monitor output through a high-performance sound system in stereo. (With preset voices, the same signal is output to both the left and right channels. With the optional FM Voicing Program, output for new voices can be directed to each channel.)

3. About the required keyboard.
   Either a Music Keyboard (YK-01, YK-10, YK-20) or a MIDI keyboard (such as the DX7) is necessary. They will function almost identically; the main differences being that you cannot play Auto Bass Chords using a MIDI keyboard, and that the Music Keyboard is not velocity-sensitive. If you use a velocity sensitive MIDI keyboard, the SFGII will respond to your touch; if, of course, the SFG voices have been programmed with velocity sensitivity. (See the FM Voicing Program manual.)

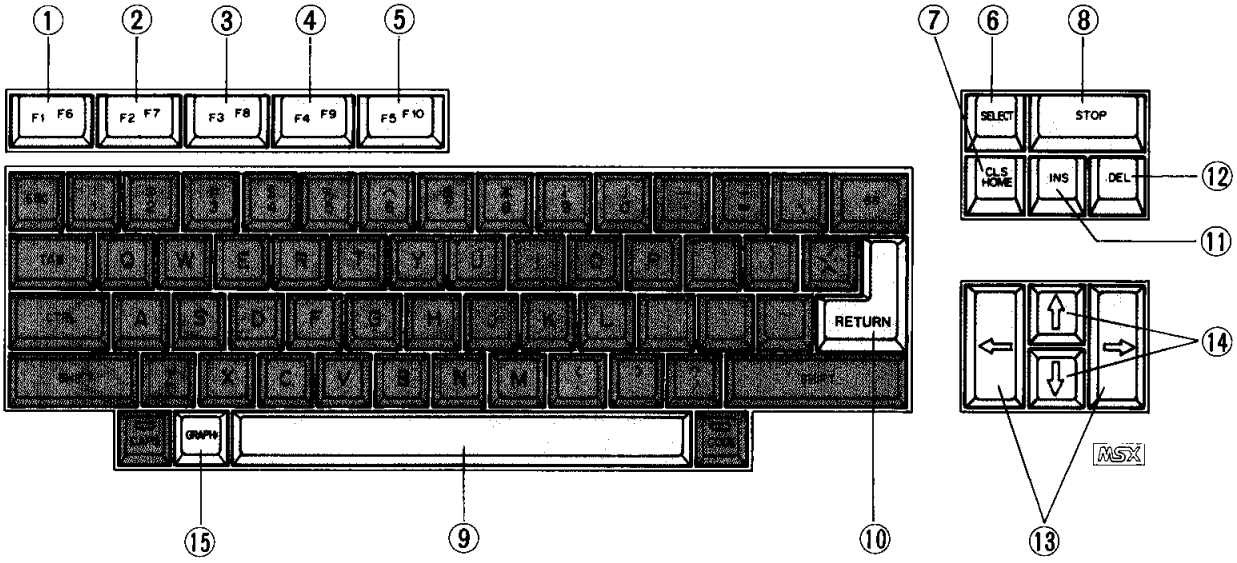
# BASIC OPERATION

To select sounds and functions on most electronic instruments, you operate switches and knobs on the panel. But on the SFGII, you select functions and change settings on the screen.

Press the [⇧] [⇩] keys to move the ➡ on the display to the function you want to change. Then, use the [⇦] [⇨] keys to change the setting. If you press the [⇦] [⇨] keys while pressing SHIFT, the setting will change in steps of 10.

## CX5MII Keyboard and Display Screen

Here are the special Keys used to operate the SFGII.




① F1 Select SOLO mode
② F2 Select POLY mode
③ F3 Select VOICE mode
④ F4 Select FILE mode
⑤ F5 Start/Stop Auto Rhythm (Solo mode)

⑥ SELECT — Change the Keyboard split point (POLY mode)
Switch between instruments 1 & 2 (VOICE mode)

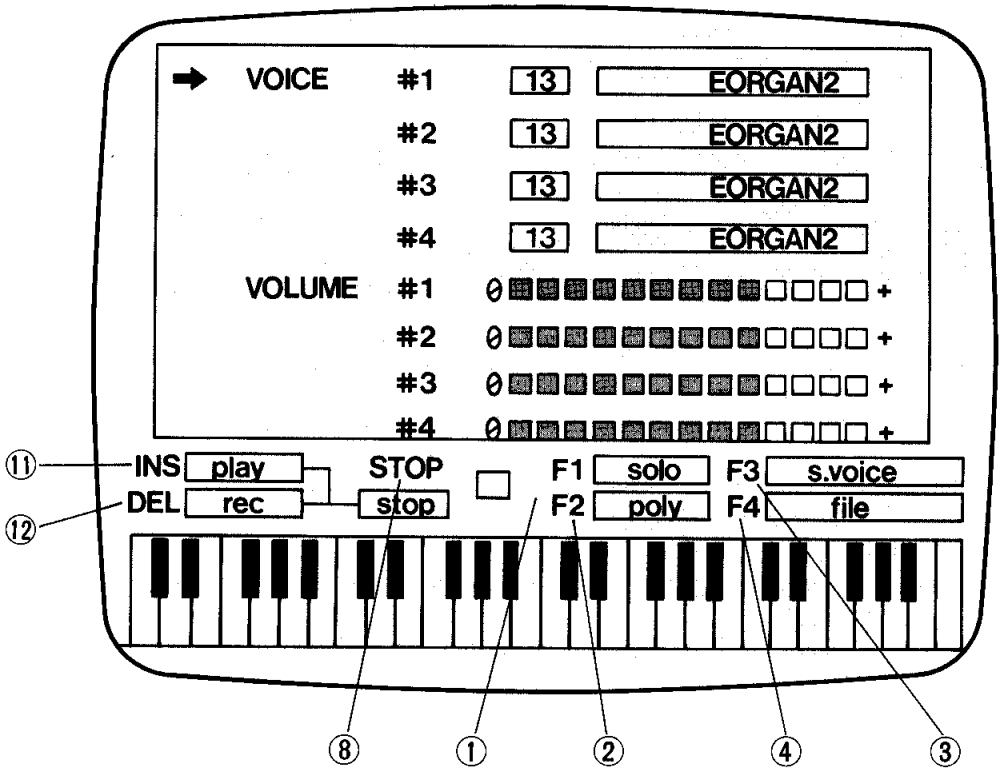
SELECTx2 — Switch between system voices and user voices

⑦ HOME — Select printer type and hard copy density

HOMEx2 — Make a hard copy of the current screen

⑧ STOP — Stop printing
Stop playback, stop record

The mode that you are in will be highlighted in yellow.

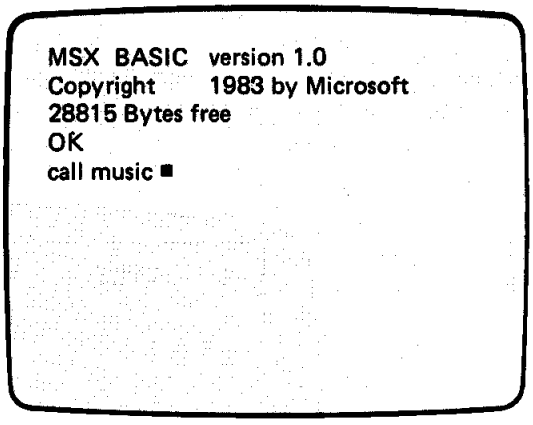



| | | |
|---|---|---|
| ⑨ | Space key | Select voice (VOICE mode) |
| ⑩ | RETURN | |
| ⑪ | INS | Start playback/record |
| ⑫ | DEL | Record |

| | | |
|---|---|---|
| ⑬ | ⇧ ⇩ | Select function (move the ➡ mark) |
| ⑭ | ⇦ ⇨ | Change the setting |
| | | Move the ➡ mark (VOICE mode) |
| | SHIFT + ⇦ ⇨ | Change in steps of 10 |
| ⑮ | GRAPH | Switch Music Keyboard display on/off |

# THE "CALL MUSIC" COMMAND

When you turn the CX5MII power on, it automatically enters MSX BASIC mode, and the following message is displayed.




NOTE:

In ordinary MSX BASIC mode, the SFGII and keyboard are inactive. To activate them, type CALL MUSIC or _MUSIC and press RETURN . In a second or two, the screen display shown at right will appear.

# ABOUT THE SFGII MODES

There are 2 ways to play the SFGII.

1. SOLO mode: in which you can play monophonically with Auto Bass Chord and rhythm accompaniment.

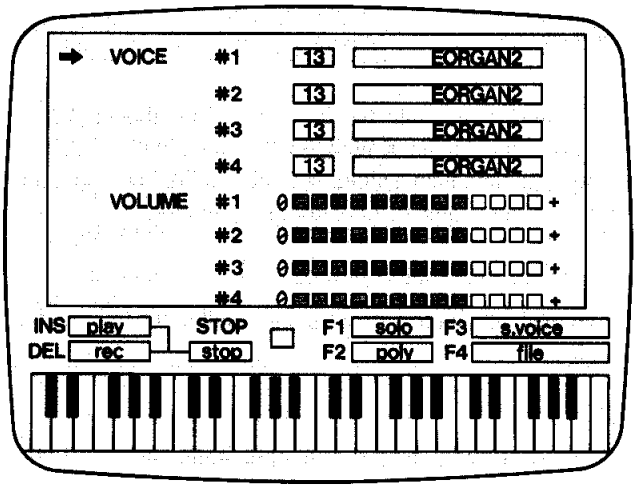
2. POLY mode: in which you can play up to 8-note chords. (No rhythm or Auto Bass Chords)
   Also, there are 2 other useful modes.

3. VOICE: in which you can see at a glance which voices (tone colors or sounds) are available.

4. FILE: in which you can save or load keyboard performances, and load voices that you have created using the separate FM Voicing Program.
   The function keys 1-4 correspond to these 4 modes. (These choices are always displayed above the keyboard at the bottom of the screen.)

# POLY MODE

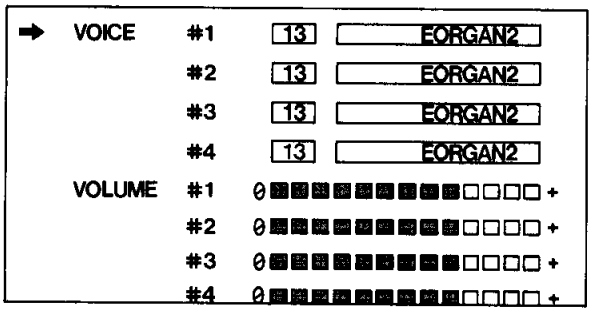
When you first activate the SFGII, it will be in POLY mode, and the display at right will appear. Only part of the parameters will be shown, but you can "scroll" the screen up and down by using the [⇧] [⇩] cursor keys. Use the [⇧] [⇩] keys to select the parameter you want to change (move the flashing arrow mark up and down), and press the [⇦] [⇨] keys to change it.
(Pressing the [⇦] [⇨] keys while pressing [SHIFT] will make the value jump up or down in steps of 10; useful for quick changes.)




## VOICE (Selecting Voice for Each Instrument)

### VOICE

By itself, the SFGII can produce up to 4 different voices at once. Each of these 4 voices can be chosen separately. Use the [⇧] [⇩] keys to move the cursor to the one you want to change, and use the [⇦] [⇨] keys to choose the voice you want. When the power is first turned on, instruments #1 ~ 4 will all be set to voice 13 EORGAN2. Move through the different voices using the [⇦] [⇨] keys. A list of the preset voices is on page 47 (You can also select voices that you created using the FM Voicing Program)



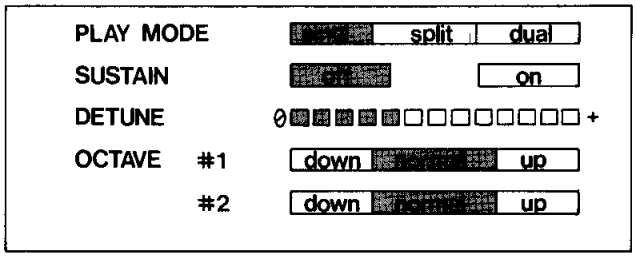

NOTE:
When the power is first turned on, only instruments #1 and #2 will be active. (#3 and #4 will be dark.) To activate #3 and #4, see MIDI p.43.

### VOLUME

This sets the output level for each instrument (0 ~ 13). Initial setting is 9.

## Play Mode

Voices 3 and 4 are only for use with MIDI. (See p.43) If you are using a Music Keyboard (YK-01, or YK-10/YK-20) only the first two voices will sound. In POLY mode, there are three ways to play these 2 voices.

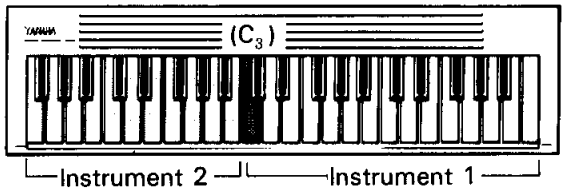



SINGLE mode

You can play up to 8 notes polyphonically, but using only one voice.

SPLIT mode

One side of the keyboard will play voice #1, and the other side will play #2.
The keyboard at the bottom of the screen will indicate what part of the keyboard is playing which voice. The white part indicates instrument 1 and the yellow indicates instrument 2. When the SFGII is activated, the split point will be C3 (middle C), but you can change this as you wish.




Setting the Split Point

Press [SELECT] once. The color indicating the keyboard range of instrument 2 will change to blue. Now, press whatever key you want to be the new split point. The color will change back to yellow. All keys to the left of the split point will play instrument 2, and the rest will play instrument 1. If you decide not to change the split point, just press [STOP] .

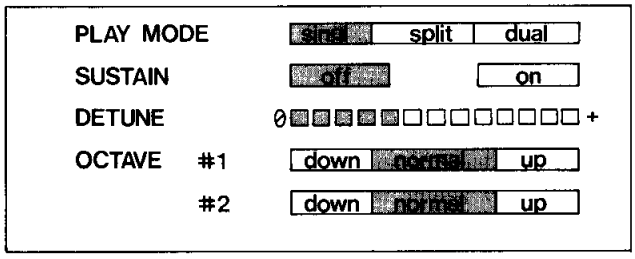
DUAL mode

In this mode, each key you press will play both instruments 1 and 2. (Since the SFGII can produce up to 8 notes at once, this means that in DUAL mode you can play chords of up to 4 notes.)

## SUSTAIN

When sustain is on and you release a key, the sound will continue just as though you were still pressing the key. Of course, if the voice is the type that decays even if you hold down the key (like a bell, for example), sustain will have no effect.

NOTE:
If you are playing the SFGII from a MIDI keyboard that has a sustain pedal, this will change each time you press and release it.




## DETUNE

This is a special effect only for DUAL mode. It lets you slightly change the pitch of instrument 2 relative to instrument 1, producing an especially thick and rich sound.

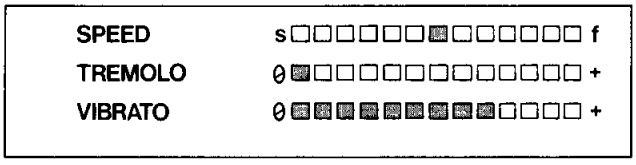
## OCTAVE UP/DOWN

This lets you move instruments 1 and 2 up or down one octave. For example: in DUAL mode you can double the instrument an octave down, for a deep and powerful sound. (Try voice #14 PORGAN)

NOTE:
The SFG has a range of 8 octaves, and if octave up/down makes it exceed this, it will shift down/up to stay within its range.

## SPEED, TREMOLO, VIBRATO

Vibrato (periodic changes in pitch) and Tremolo (periodic changes in volume) have been set at ideal levels for each voice. However, you may change this if you wish. Remember that the settings you make here will affect all voices equally. Also, there may be little or no effect on some voices. Pressing ⇨ will make the speed of Vibrato and Tremolo faster; ⇦ will slow it down. ⇨ will increase the amount of Vibrato or Tremolo, and ⇦ will decrease it.




NOTE:
When you create your own voices using the optional FM Voicing Program, remember that these Vibrato and Tremolo settings affect the AMD and PMD of the LFO. Therefore, if PMS and AMS of the voice you create are set to 0, Vibrato and Tremolo will have no effect.

**TEMPO**

This sets the tempo for recording and playback. (See p.38)

**TRANSPOSE**

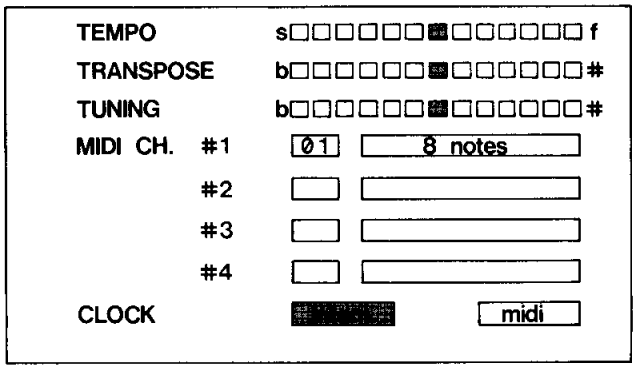
This lets you transpose up or down in half-steps, to a maximum of 7 steps. (All voices move together.) Each time you press ⇦ / ⇨ it will go down/up a 1/2 step.

**TUNING**

This lets you make fine adjustments in the tuning, to a maximum of 1/2 step up or down. Pressing the ⇦ / ⇨ keys will take the tuning up/down in steps of about 1.6 cents.

**MIDI (MIDI CH, CLOCK)**

See MIDI, p.43.



# SOLO MODE (Press F1)

In this mode you can play monophonically with Auto Rhythm and Auto Bass Chord accompaniment. The keyboard will play only one note at a time, but each note will sound 2 voices. (The same as dual mode in POLY.) Also, in this mode you can set various types of Portamento.

## VOICE (Selecting Voices for Each Instrument)

### VOICE

You may select each voice just as in POLY mode. (see p.29)

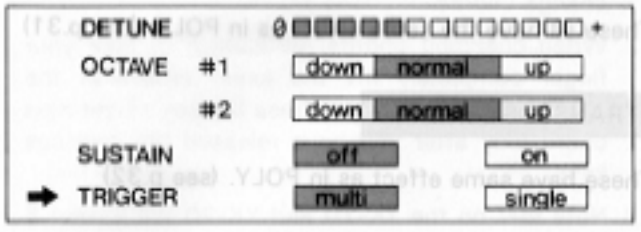
### VOLUME

This is the volume control for the sound you play on the keyboard.

### Balance

This is the volume balance of the two voices. When the marker is in the center, they will have the same volume. However, some voices may seem louder or softer than others, so balance them as you wish. Moving to the left ⇦ makes voice 1 louder, and ⇨ makes voice 2 louder.

## Effects and Other Functions




### DETUNE

This is the same effect as in POLY. (see p.31) In SOLO mode the keyboard is always in dual mode, so detune is always active.

### OCTAVE, SUSTAIN

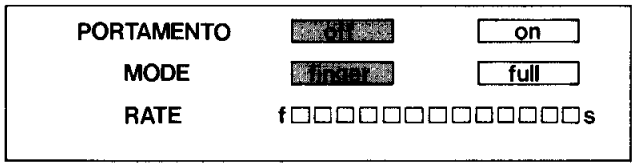
The same effect as in POLY. (see p.31)

### TRIGGER

This effect is unique to SOLO mode. It lets you specify whether each key pressed will trigger a new attack or not. Each time you press a key in "multi," the sound starts over again, regardless of how much or little it has decayed from the last note. For instance, if you are playing a bell-type voice, there will be the usual sharp, percussive attack for each new note. However if "single" is on, and you press a key while still holding down the previous key, there will be no new attack. The pitch will shift to the new key, but the sound will continue decaying just as if you had not played a new note. Obviously, if you keep playing notes with a voice that eventually decays to zero (like a bell), each new note will be softer and softer until you finally get no sound. When you release all keys and hit again, the voice will sound again normally.

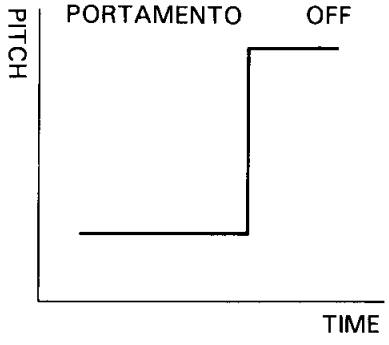
## PORTAMENTO (ON/OFF, MODE, RATE)

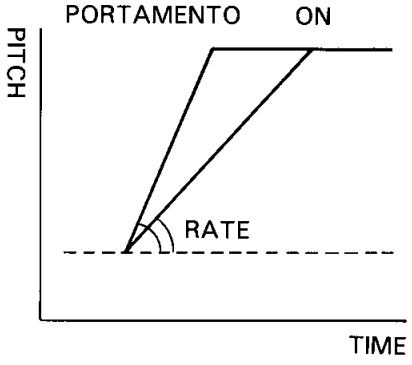
When this is on, it produces a "glide" from one note to the next.




MODE: This determines how the portamento acts. When "finger" is on, portamento will occur only when you play legato (press a key while holding down the last one). When "full" is on, portamento occurs with every note, whether or not the last note is still pressed.

RATE: This determines how fast the glide between notes is. Moving the marker to the left will produce a faster glide; moving right, a slower glide.



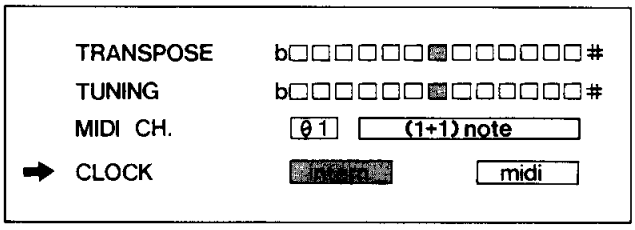




## SPEED, TREMOLO, VIBRATO

These all have the same effect as in POLY. (see p.31)

## TRANSPOSE, TUNING

These have same effect as in POLY. (see p.32)




## MIDI CH.

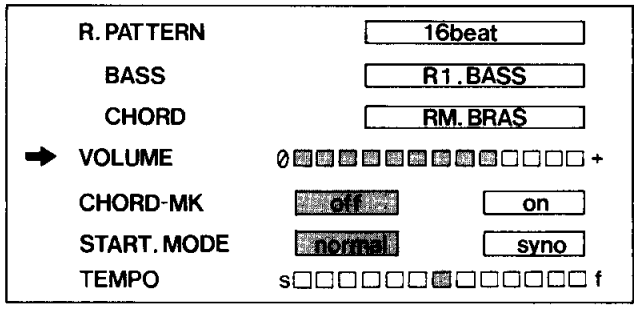
This lets you select the MIDI reception channel. (see MIDI p.43) If you select the blank space (between 16 and 1), MIDI signals will not be received. Remember that in SOLO mode all keyboard playing is monophonic (only one note at a time), so the "(1 + 1) note" display will not change.

## CLOCK

This lets you select whether the tempo of the auto rhythm is controlled by the SFG's internal clock or by MIDI timing clock signals from outside. When "midi" is selected, the TEMPO display will change color and have no effect. (see MIDI, p.43)

# AUTO RHYTHM/AUTO BASS CHORD

This is perhaps the most interesting feature of SOLO mode. Auto Rhythm gives you a percussion accompaniment, and Auto Bass Chord lets you produce chords in sync with the rhythm simply by holding one finger down on the keyboard.
To start or stop the auto rhythm, press [F5] . (If the start mode is "sync," it will wait for you to press a key before starting.)




## R. PATTERN

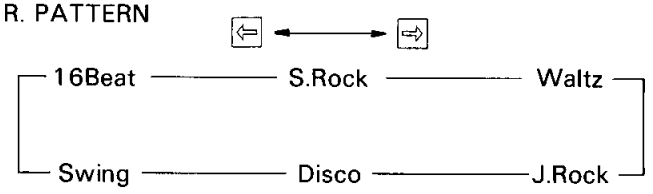
This lets you select one of 6 rhythm patterns, as shown at right. Use the [⇦][⇨] keys to move through the patterns.

BASS Here you choose which bass sound you want: R1.BASS or R2BASS.

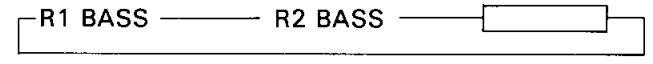
CHORD Here you choose which chord sound you want: RM.BRAS, RM.FLUTE, RM.GUIT, or RM.HORN.

NOTE:
For both Bass and Chord, if a blank is selected, it means that instrument will not sound.

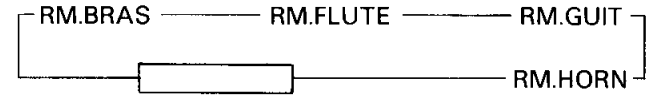
R. PATTERN




BASS




CHORD




## VOLUME

This sets the volume of the rhythm section.

## CHORD MK

When this is "on," part of the Music Keyboard is set aside for the Auto Bass Chord.
(see AUTO BASS CHORD next page.)

## START MODE

When this is on and you press [F5] to start the rhythm, it will wait for you to press a key before beginning the rhythm (ie., "synchro start").

## TEMPO

This sets the tempo of the rhythm accompaniment. Move the marker left for a slower tempo; right for faster.

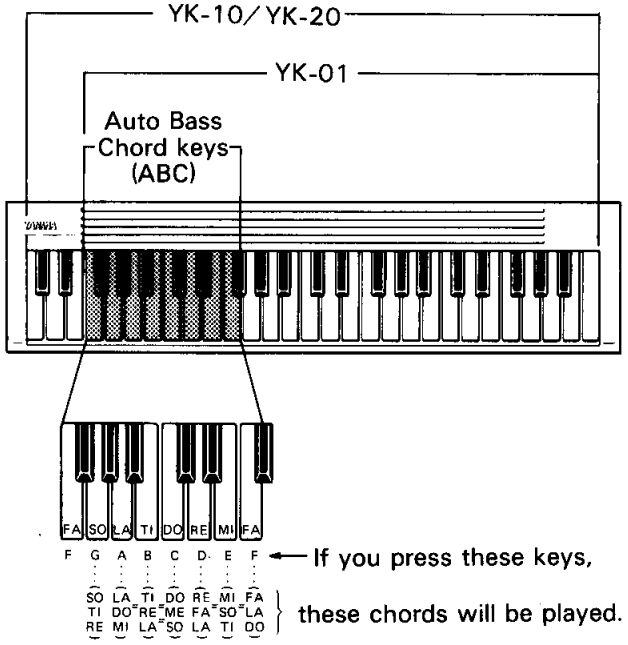
## AUTO BASS CHORD (ABC)

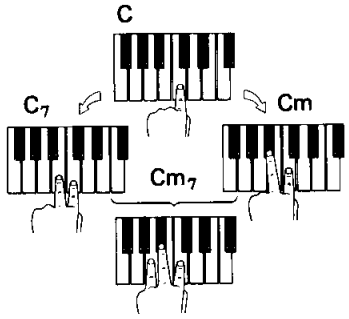
To play ABCs, you must use a Yamaha Music Keyboard; YK-01, 10 or 20. Playing on a MIDI keyboard will not produce ABCs.
Using ABC, you can play chords using one or more fingers.

1. Set CHORD MK. to "on." This sets aside part of the keyboard for ABCs. The ABC area will turn blue on the screen display. (See diagram)
2. Select voices for the bass and chord. (If you selected a blank, there will be no sound.)
3. When you press [F5] , the ABC will start in sync with the rhythm. (If START MODE is "sync," it will wait for you to press a key before starting.)
4. Press a key in the ABC area to produce a chord. You can Produce 4 types of chords using ABC by pressing 1 ~ 3 keys simultaneously (see diagram).

NOTE:

1. The chord and bass note for the rhythm accompaniment will change when you press another key in the ABC area. Bass notes and chord patterns are synchronized with the rhythm. Once an ABC key has been pressed, that chord and bass note will be repeated until another ABC key is pressed. So you only have to press an ABC key if you want to change chords.
2. When changing chords, be careful to take your finger completely off the keys; otherwise the chords may not change. Press the key of the next chord only after you have released the previous keys.
3. Note that on the YK-10 and YK-20 the lowest 5 keys do not function in ABC mode.




C7 Chord
Press a white key to the left of the key pressed for a major chord, together with the chord root key to produce a seventh chord.

Cm Chord
Press the black key Immediately to the left of the key pressed for a major chord, together with the chord root key, to produce a seventh chord.

Cm7 Chord
Press the black key immediately to the left of the key pressed for a major chord, and a white key to the left of root key, along with the chord root key, to produce a minor seventh chord.

# VOICE MODE (press F3)

This mode lets you see at a glance which voices are available. When you press [F3] , the screen display will show the following.
The 2 currently selected voices are lit; instrument 1 is white, and instrument 2 is yellow.
Move the ➡ mark using the cursor keys. To select a new voice, move the ➡ to the voice you want, and press [RETURN] or [SPACE] key. The newly selected voice will light up.

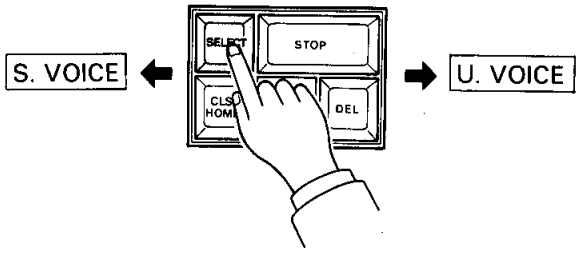
NOTE:
That the color of the ➡ indicates whether you are selecting instrument 1 or 2 (white or yellow). To switch the color of the ➡, press [SELECT] once.
Voices 47 and 48 are not used. If you select these, there will be no sound.

| | | |
|---|---|---|
| 01 BRASS 1 | 17 PICCOLO | 33 LO STG 1 |
| 02 BRASS 2 | 18 OBOE | 34 HORN LO |
| 03 TRUMPET | 19 CLARINET | 35 WHISTLE |
| 04 STRING 1 | 20 GLOCKEN | 36 STORM |
| 05 STRING 2 | 21 VIBRPHN | 37 RM. BRAS |
| 06 EPIANO 1 | 22 XYLOPHN | 38 RM. FLUT |
| 07 EPIANO 2 | 23 KOTO | 39 RM. GUIT |
| 08 EPIANO 3 | 24 ZITHER | 40 RM. HORN |
| 09 GUITAR | 25 CLAV | 41 R1. BASS |
| 10 EBASS 1 | 26 HARPSIC | 42 R2. BASS |
| 11 EBASS 2 | 27 BELLS | 43 SNAREDR |
| 12 EORGAN 1 | | 44 RD CYMB |
| | 29 SMADSYN | 45 PERC 1 |
| 14 PORGAN 1 | 30 HARMONI | 46 PERC 2 |
| 15 PORGAN 2 | 31 STEELDR | 47 CSM |
| 16 FLUTE | 32 TIMPANI | 48 |

Currenty selected voices

## SYSTEM VOICES and USER VOICES

The SFG always has 48 preset voices (system voices) which are there when you turn the power on. Using the seperate FM Voicing Program, you can create your own voices to use with the SFGII. You can load these "user voices" into the SFGII (see FILE mode, p.40). The SFGII has memory space for 48 system voices and 48 user voices. To switch back and forth between these two, press [SELECT] twice (quickly). On the screen, the F3 box (above the keyboard on the right) will change from "s.voice" (system voice) to "u.voice" (user voice. If you have loaded your own set of voices into the SFGII, they will be displayed. If you have not, blank spaces will be displayed.




Press twice quickly

NOTE:
You can switch between "user" and "system" voices at any time, no matter which mode you are in. Simply press [SELECT] twice. The message after [F3] will alternate between "s.voice" and "u.voice".

# RECORDING KEYBOARD PLAY

This function lets you record and play back performances on the keyboard (Music Keyboard or MIDI Keyboard). In effect, it is a kind of real time sequencer. You can record in either POLY or SOLO mode. Since only note data is recorded, voices, tempo, transpose, and tuning can be changed during playback. You can save recorded performances onto a disk or cassette. (see FILE mode, p.40)

## RECORDING

Press [DEL] .Now, when you press [INS] , recording will start. Whatever notes you play on the keyboard will be recorded into memory. Pressing [STOP] will stop the recording. The memory capacity is about 1800 notes. (If there is a Floppy Disk Drive attached to the system, the capacity will be a bit less.) If the capacity is exceeded, the recording will stop at that point.

NOTE:

If you turn the MSX power off, your recording will be lost. Be sure to save it on a tape or disk. Only note on/off information is recorded. Other information received via MIDI, such as program change or control change (eg. sustain pedal), will not be recorded.

## PLAYBACK

When you press [INS] , playback will begin. To stop playback, press [STOP] . It may be interesting to change voices or transpose settings while your performance is being played back. You can accompany a recorded performance with "live" playing on the keyboard. However, the total number of notes at one time may not exceed 8 (in POLY mode). Due to limitations of the computer, playback tempo may sometimes be a bit slower.

NOTE:

You can synchronize playback with an external MIDI sequencer or device that sends time clock signals. see p.44

## RECORDING AUTO BASS CHORDS

You may record performances with Auto Bass Chords. (SOLO mode)

1. Set CHORD.MK to "on" (setting aside part of the keyboard for Auto Bass Chords).
2. Set start mode to "sync," and press [F5] to start.
3. Press [DEL] and then [INS] to start recording.
4. Press [STOP] to end recording.

## AUTO BASS CHORD PLAYBACK

1. Make sure CHORD.MK is "on," and start mode is set to "sync."

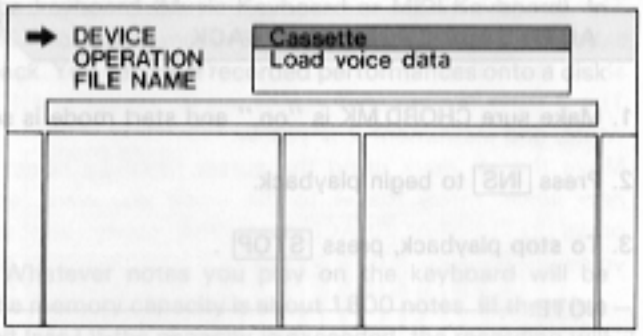
2. Press [INS] to begin playback.

3. To stop playback, press [STOP] .

NOTE:
It is possible to record just the Auto Bass Chord section and play the keyboard during playback.

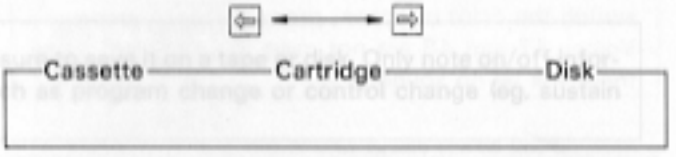
# FILE MODE (Press F4)

In this mode, you may save and load recorded keyboard performances (event data) to and from a disk or cassette. Also, you may load voice data that you created using the seperate FM Voicing Program. You can also load voices from a Data Cartridge (Yamaha UDC-01). When you press [F4], the screen shown at right will appear.




## DEVICE

This indicates which device you are saving to or loading from. Press the [⇦] [⇨] keys to step through the 3 choices; Cassette-Cartridge-Disk.




NOTE:

Depending on the operation that is being performed, these 3 devices may not always be selectable. For instance, you cannot load event data from a Cartridge. So when OPERATION has been set to "load event data," you will not be able to select "Cartridge".

## OPERATION

This is where you select what you want to do. Here are the possible operations for each device.

| OPERATION | Cassette | Cartridge | Disk |
|---|---|---|---|
| Load voice data | ○ | ○ | ○ |
| Load event data | ○ | X | ○ |
| Save event data | ○ | X | ○ |
| Kill a file | X | X | ○ |
| Files | X | X | ○ |

## FILE NAME

This is where you name the file you are saving, or specify which file you want to load. The file name must be capital letters or numbers, and up to 8 characters long. You can use the [BS] key to erase the character to the left of the ▲ mark, and use the [⇦] [⇨] keys to move the ▲ left and right.
If you input a space in your file name, it will be automatically deleted. For example, DA TA is the same as DATA.

[BS] ——— Delete one character to the left of the ▲.
[⇦] ——— Move ▲ to the left.
[⇨] ——— Move ▲ to the right.

NOTE:

When you execute the "Files" command, all the file names on that disk will be displayed on the screen. You can specify the file name simply by moving the ➡ mark to the one you want. This means you don't have to type in the name.
When you press [RETURN], the operation you have selected will be preformed. If you are saving or loading, it will ask you "Sure?" Check again; and if you are sure it's OK, press "Y" or [RETURN] again. If you press any other key, the operation will be aborted.

## Saving and Loading with Cassette

1. Select DEVICE "Cassette".

2. Select OPERATION "Save" or "Load".

3. Input FILE NAME.

4. Set cassette;  to record for "Save", to play for "LOAD".

5. Press [RETURN], and replay to "Sure?" by pressing it again.

6. When finished, stop the tape.

NOTE:

If you don't enter a file name, it will load the first one it finds.
If the file name you entered does not match what is on the tape, it will continue skipping over files until it finds the right one. The file name being skipped will appear in the message window.
If you want to quit while loading or saving, press [STOP] while holding down [CTRL].

## Loading voices from Data Memory Cartridge (UDC-01)

Remember that with only the SFGII by itself, all you can do with a Data Cartridge is load voice data.
Follow the procedure outlined above for steps 1, 2, 3, 5.
Even if you don't input a file name, data will be loaded. But if the file name you input does not match the data in the cartridge, data will not be loaded. Instead, the file name of the cartridge will be displayed in the message window.

NOTE:

REMEMBER that all cartridges (ROM Software or Data Cartridges) must be inserted in the slots BEFORE you turn the power on. Do not insert a cartridge while the power is on. This could permanently damage the cartridge and computer.

## Using the Floppy Disk

### SAVING AND LOADING

Follow the steps 1, 2, 3, 5 as outlined for cassette. When you save, a file discripter of .EVG will automatically be added to your file name. Before you save onto a new disk, you must format it using the DISK-BASIC FORMAT command. (see the owner's manual for your disk drive)
When loading, if you do not enter a file name, the file that was written first will be loaded.

## KILL A FILE

This operation lets you wipe out a file that you no longer need. A file discripter of .EVB will automatically be added to the file name you input. So if you want to kill a file with a different discripter, such as a voice data file, list the files by executing the "Files" command. Then, move the → mark to the file you want to kill, select "Kill A File," and press RETURN .

## FILES

This command shows you all the files on the disk. Select OPERATION "Files," and press RETURN . If there are too many file names to fit on the screen at once, the message area will ask "More?" When you are ready to see the rest of the files, press RETURN or "Y." Pressing any other key will end the command.

## ERROR MESSAGES

When saving or loading data, one of the following messages will be displayed if something is wrong.

| ERROR MESSAGE | MEANS · CAUSE |
|---|---|
| IO error | An error occurred while saving or loading data. |
| Bad file name | The file name is wrong. Enter the correct file name. |
| Device not ready | The device you specified is not connected. Make sure it is correctly connected. |
| File not found | The specified file cannot be found. Check the file name and input the correct one. |
| Write protect | The floppy disk is write protected. Remove the write protect. |
| FD not ready | There is no floppy disk in the drive. Make sure that a disk is correctly inserted in the drive. |
| Disk full | You have tried to save onto a floppy disk on which there is no more room. Delete some unnecessary files, or use a new disk. |
| Size too big | There is too much data, so it cannot be loaded. |
| Type mismatch | The file type is incorrect, and cannot be loaded. |

# MIDI

MIDI (Musical Instrument Digital Interface) is a worldwide standard for transmitting musical data. Just as all MSX personal computers, peripherals and software will work together, instruments that meet MIDI specifications can communicate with and control each other.

## MIDI Reception

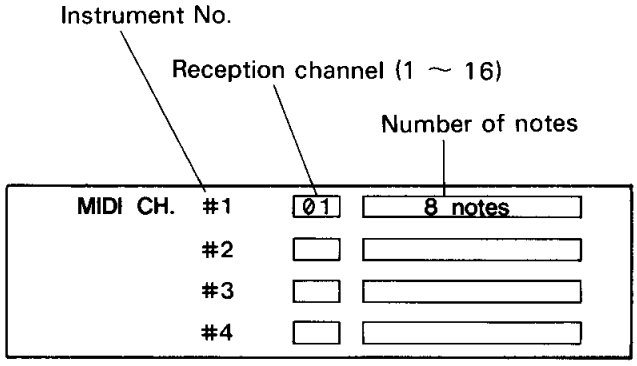
In both SOLO and POLY modes, a MIDI instrument can control the SFGII, and you can use a MIDI keyboard in place of a Music keyboard. However, a MIDI keyboard cannot play Auto Bass Chords (SOLO mode).

### SETTING MIDI RECEPTION CHANNELS

In POLY mode, instruments 1 ~ 4 can all be controlled by MIDI information. Each instrument can have a different reception channel. This means you can play up to 4 different voices at once.

The MIDI transmission channel of the keyboard must match the reception channel of the SFGII.

- To enable MIDI reception, move the → to the instrument, and use the [⇦] [⇨] keys to select the reception channel. When a blank is selected, reception is off.
- When power is first turned on, instruments 1 and 2 are both set to receive MIDI channel 1.
- In SPLIT and DUAL modes, instrument 2 will always receive the same channel as instrument 1. It cannot be set independently.
- Number of notes per instrument
  The SFGII can produce up to 8 notes simultaneously. In SINGLE mode (POLY), only one instrument is used, and therefore you can play up to 8 notes at once. In DUAL and SPLIT modes, instruments 1 and 2 are used. If you use MIDI to play these instruments, there will be no change in the number of notes you can play. But if you activate instruments 3 and 4 to receive MIDI, the number of notes for each instrument will be as follows.
- The number of notes each instrument can produce will be displayed to the right of the reception channel.



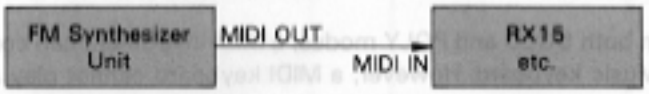

| Play mode | Pattern | Inst. 1 | Inst. 2 | Inst. 3 | Inst. 4 |
|---|---|---|---|---|---|
| SINGLE | 1 | 8 | OFF | OFF | OFF |
| | 2 | 6 | 2 | OFF | OFF |
| | 3 | 6 | OFF | 2 | OFF |
| | 4 | 6 | OFF | OFF | 2 |
| | 5 | 4 | 2 | 2 | OFF |
| | 6 | 4 | 2 | OFF | 2 |
| | 7 | 4 | OFF | 2 | 2 |
| | 8 | 2 | 2 | 2 | 2 |
| SPLIT PLAY | 1 | 4 | 4 | OFF | OFF |
| | 2 | 3 | 3 | 2 | OFF |
| | 3 | 3 | 3 | OFF | 2 |
| | 4 | 2 | 2 | 2 | 2 |

## Synchronized Playback

When playing back a recorded performance (see p.38), you may synchronize it to an external MIDI rhythm machine or sequencer. Or, you may do the opposite; synchronize an external device to the SFGII.

### SYNC EXTERNAL DEVICE TO SFGII

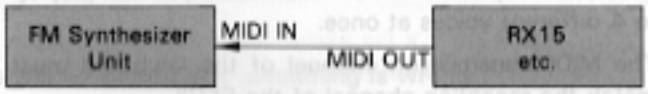
Set CLOCK to "internal." The SFGII will send timing clock, start and stop signals from MIDI OUT. If you set the external device's clock to "MIDI (external)," it will play in sync with the SFGII.
Start playback as usual. (p.38)




Set CLOCK to INTERNAL — Set SYNC to MIDI CLOCK

### SYNC SFG TO EXTERNAL DEVICE

Set CLOCK to "midi." The SFGII will synchronize to the start, stop and timing clock signals received from MIDI IN.
Press INS to start playback. Now the SFGII will wait for a MIDI start signal from the external device.




Set CLOCK to MIDI CLOCK — Set SYNC to INTERNAL

## MIDI Preception Data

The FM Sound Synthesizer Unit II will receive the following MIDI data.

### CHANNEL MESSAGES

When MIDI reception channel numbers are specified for each instrument, they will receive the following information sent on their channel.

1) Key off

| | | |
|---|---|---|
| Status | 1000nnnn (8nH) | n=Channel no. |
| Note no. | 0kkkkkkk | K=0 (c−2) ~ 127 (G8) |
| Velocity | 0vvvvvvv | V: ignored |

2) Key on

| | | |
|---|---|---|
| Status | 1001nnnn (9nH) | n=Channel no. |
| Note no. | 0kkkkkkk | k=0 (C−2) ~ 127 (G8) |
| Velocity | 0vvvvvvv | v=0 Key off<br>v=1 ~ 127 Key on |

3) Control change

| | | |
|---|---|---|
| Status | 1011nnnn (BnH) | n=Channel no. |
| Control no. | 0ccccccc | c=Control no. |
| Control value | 0vvvvvvv | |

C= 5 Portamento time (only SOLO mode)
C= 7 Volume
C= 64 Sustain switch
C= 65 Portamento switch (only SOLO mode)
C=123 All note off

4) Program change

| | | |
|---|---|---|
| Status | 1100nnnn (CnH) | n=Channel no. |
| Program no. | 0ppppppp | p=Program no. (0 ~ 47) |

### System Realtime Messages

When CLOCK is set to "midi," the following system realtime messages will be received.

1) Timing clock

| | |
|---|---|
| Status | 11110000 (F8H 2) Start |
| Status | 11110010 (FAH) |

2) Continue start

| | |
|---|---|
| Status | 11110011 (FBH) |

3) Stop

| | |
|---|---|
| Status | 11111100 (FCH) |

## MIDI Transmission Data

Note data from the Music Keyboard and playback note data will be sent on MIDI channel 1.

### CHANNEL VOICE MESSAGE

1) Key on/off

| | | |
|---|---|---|
| Status | 1001000 (90H) | |
| Note no. | 0kkkkkkk | k=0 (C−2) ~ 127 (G8) |
| Velocity | 0vvvvvvv | v=0 Key off |
| | | v=1 ~ 127 Key on |

2) SYSTEM REALTIME MESSAGES

When CLOCK is set to "internal," the following System Realtime messages will be transmitted.

1) Timing clock

Status 11110000 (F8H)

2) Start

Status 11111010 (FAH)

3) Stop

Status 11111100 (FCH)

# PRINTOUT

You can make a hard copy (printout) of the screen in whatever mode you are in. Simply press [HOME] twice rapidly. You can use either an MSX printer or an Epson printer. By pressing [HOME] once, select the type of printer (msx or epson), and whether to make a single density or double density hard copy. Each time you press [HOME], it will cycle through the choices as shown below. The currently selected type will appear in the [F4] (FILE) window.

msx-pr/D ——— msx-pr/S ——— eps-pr/D ——— eps-pr/S

When you have set the printing mode, press [STOP].
Now, when you press [HOME] twice rapidly, the printer will make a hard copy of the screen.
To halt printing, press [STOP] while holding down [CTRL].

# FM VOICE LIST

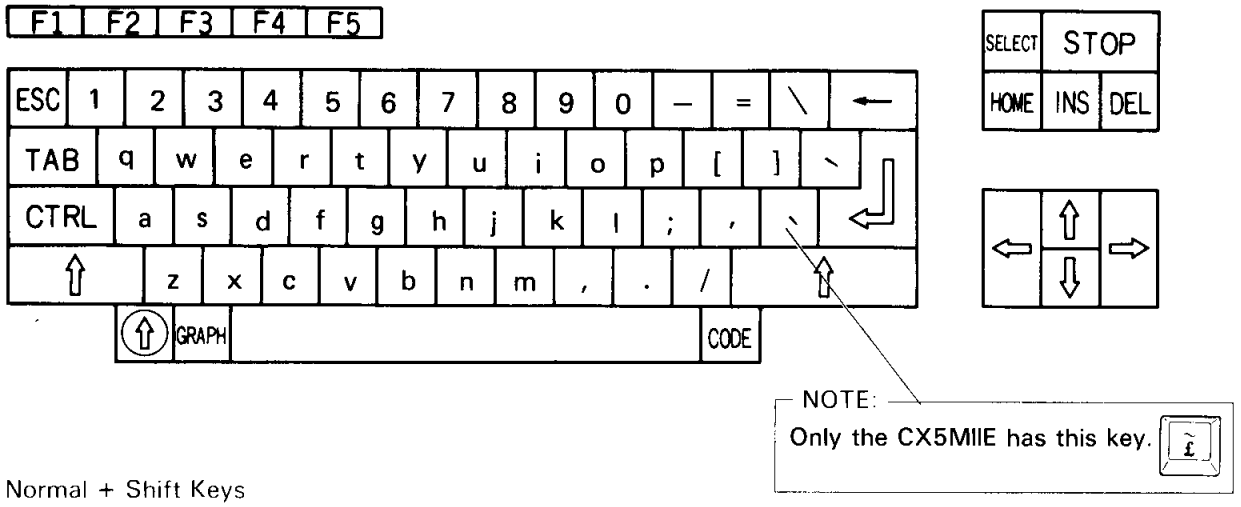
This table lists internal voices of the FM Sound Synthesizer unit.
Use the voice number when setting the voices with the FM Music Composer.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | BRASS 1 | 13 | EORGAN 2 | 25 | CLAV | 37 | RM. BRAS |
| 02 | BRASS 2 | 14 | PORGAN 1 | 26 | HARPSI | 38 | RM. FLUT |
| 03 | TRUMPET | 15 | PORGAN 2 | 27 | BELLS | 39 | RM. GUIT |
| 04 | STRING 1 | 16 | FLUTE | 28 | HARP | 40 | RM. HORN |
| 05 | STRING 2 | 17 | PICCOLO | 29 | SMADSYN | 41 | R1. BASS |
| 06 | EPIANO 1 | 18 | OBOE | 30 | HARMONI | 42 | R2. BASS |
| 07 | EPIANO 2 | 19 | CLARINET | 31 | STEELDR | 43 | SNAREDR |
| 08 | EPIANO 3 | 20 | GLOCKEN | 32 | TIMPANI | 44 | RD CYMB |
| 09 | GUITAR | 21 | VIBRPHN | 33 | LO STG 1 | 45 | PERC 1 |
| 10 | EBASS 1 | 22 | XYLOPHN | 34 | HORN LO | 46 | PERC 2 |
| 11 | EBASS 2 | 23 | KOTO | 35 | WHISTLE | 47 | CSM |
| 12 | EORGAN 1 | 24 | ZITHER | 36 | STORM | 48 | |

# ADDITIONAL INFORMATION

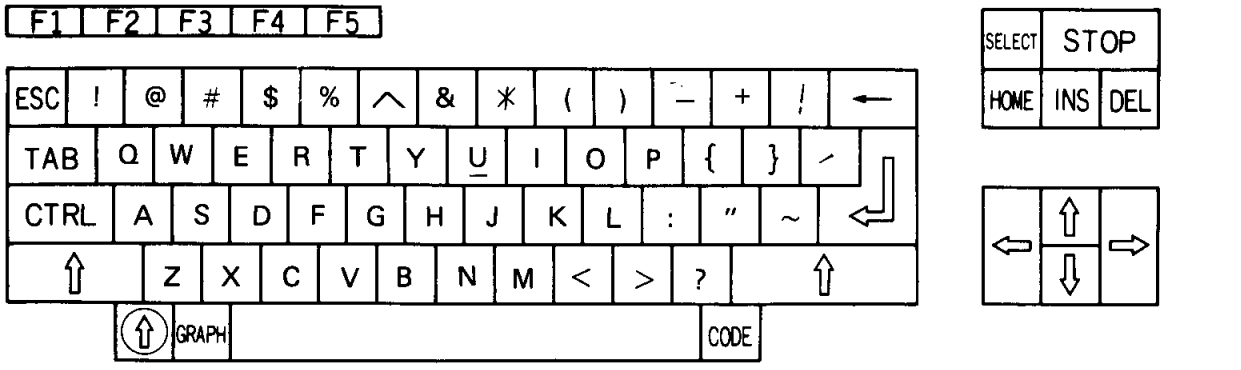
# KEYBOARD MODES

NOTE:
The CX5MIIF has a different keyboard layout. (See the same page number of the French language section.)

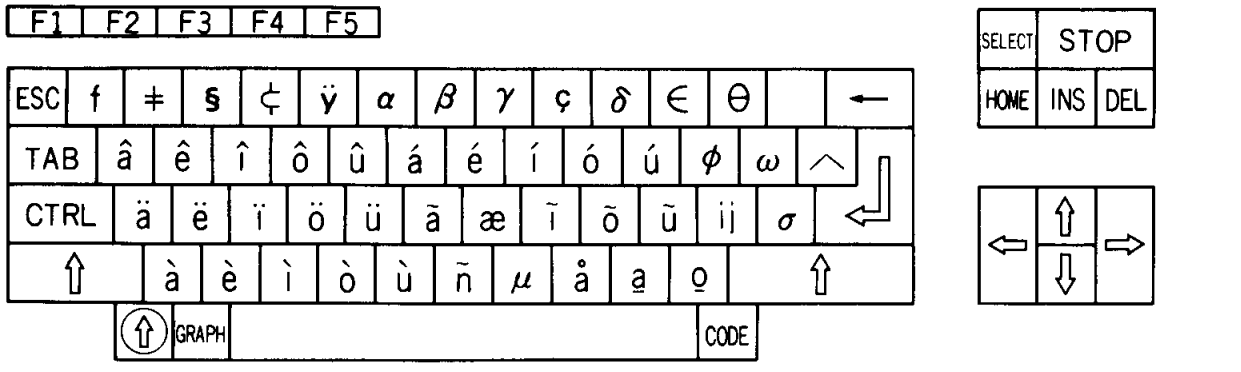



NOTE:
Only the CX5MIIE has this key. £

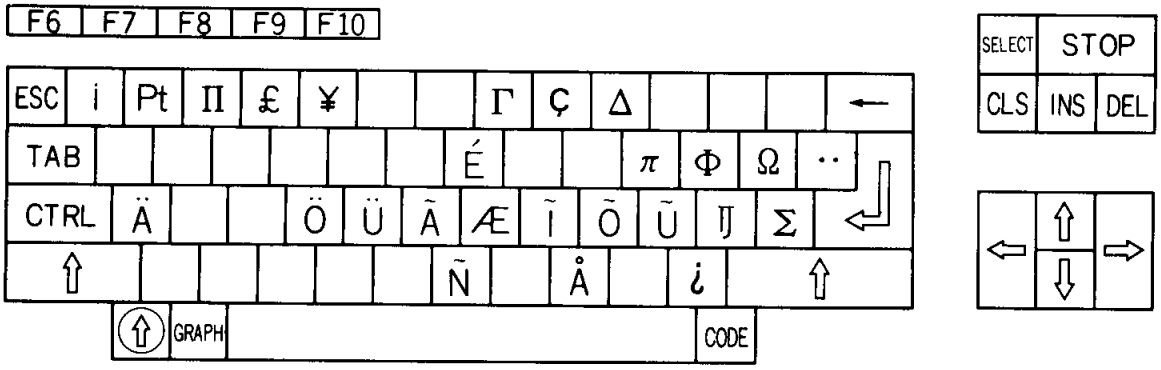
Normal + Shift Keys



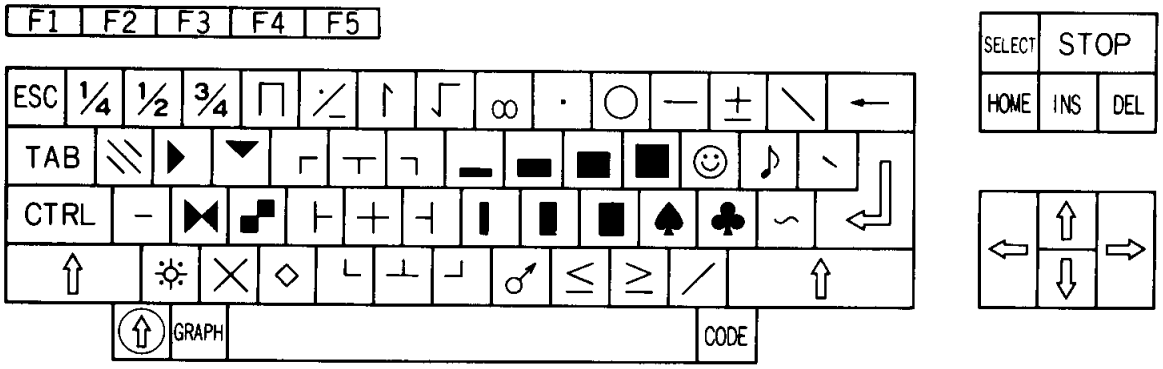

Code Key



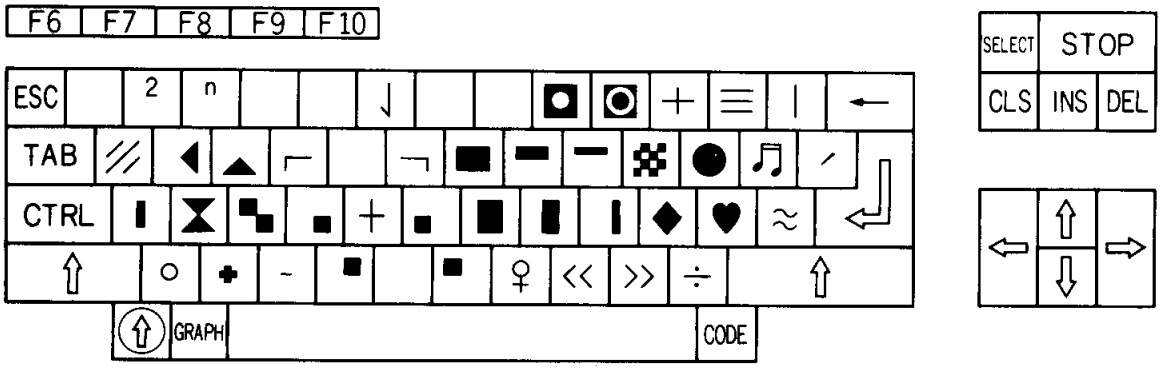
Code + Shift Keys




Graph Key




Graph + Shift Keys



# ASCII CODE TABLE

Graphic codes in the following chart can be designated by CHR $& (hex).

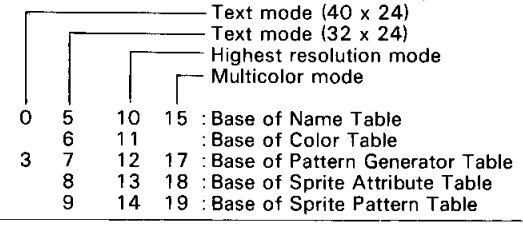
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | ┼ | | 0 | @ | P | ` | p | Ç | É | á | Ã | ▬ | ◀ | α | ≡ |
| 1 | ☺ | ┴ | ! | 1 | A | Q | a | q | ü | æ | í | ã | ▚ | ⧗ | β | ± |
| 2 | ☻ | ┬ | " | 2 | B | R | b | r | é | Æ | ó | Ĩ | ▄ | ⋈ | Γ | ≥ |
| 3 | ♥ | ┤ | # | 3 | C | S | c | s | â | ô | ú | ĩ | ▬ | ▪ | Π | ≤ |
| 4 | ◆ | ├ | $ | 4 | D | T | d | t | ä | ö | ñ | Õ | ▬ | ▗ | Σ | ⌠ |
| 5 | ♣ | ┼ | % | 5 | E | U | e | u | à | ò | Ñ | õ | ▄ | ▝ | σ | ⌡ |
| 6 | ♠ | │ | & | 6 | F | V | f | v | å | û | a | Õ | ▌ | ▖ | μ | ÷ |
| 7 | • | — | ' | 7 | G | W | g | w | ç | ù | º | ũ | ▟ | ▚ | γ | ≈ |
| 8 | ◘ | ┌ | ( | 8 | H | X | h | x | ê | ÿ | ¿ | IJ | ▄ | △ | Φ | ○ |
| 9 | ○ | ┐ | ) | 9 | I | Y | i | y | ë | Ö | ⌐ | ij | ▐ | ‡ | θ | ● |
| A | ◙ | └ | * | : | J | Z | j | z | è | Ü | ¬ | ¾ | ▄ | ω | Ω | - |
| B | ♂ | ┘ | + | ; | K | [ | k | { | ï | ¢ | ½ | ~ | ╱╱ | ▄ | δ | √ |
| C | ♀ | × | , | < | L | \ | l | ¦ | î | £ | ¼ | ◇ | ╲╲ | ▬ | ∞ | n |
| D | ♪ | ╱ | – | = | M | ] | m | } | ì | ¥ | ¡ | ‰ | ▼ | ▌ | φ | ² |
| E | ♫ | ╲ | . | > | N | ^ | n | ~ | Ä | Pt | 《 | ¶ | ▲ | ▐ | ε | ▮ |
| F | ☼ | ┼ | ╱ | ? | O | _ | o | △ | Å | ƒ | 》 | § | ▶ | ▬ | η | |

# CONTROL CODE TABLE

The following table shows the function of each key when pressed together with the CTRL key.

| Keyword | Decimal | Hexadec | Function |
|---|---|---|---|
| A | 1 | 01 | Header for graphic character |
| B | 2 | 02 | Moves cursor to beginning of word |
| C | 3 | 03 | Interrupts input wait status or |
| D | 4 | 04 | Ignored (ends AUTO command mode) |
| E | 5 | 05 | Deletes the line after the cursor |
| F | 6 | 06 | Moves cursor to next word |
| G | 7 | 07 | Bell |
| H | 8 | 08 | Backspace |
| I | 9 | 09 | Same as TAB key |
| J | 10 | 0A | Line feed |
| K | 11 | 0B | Moves cursor to home position |
| L | 12 | 0C | Clears screen |
| M | 13 | 0D | Carriage return |
| N | 14 | 0E | Moves cursor to last sentence |
| O | 15 | 0F | Ignored |
| P | 16 | 10 | Ignored |
| Q | 17 | 11 | Ignored |
| R | 18 | 12 | Inserts character to the left |
| S | 19 | 13 | Ignored (of the cursor) |
| T | 20 | 14 | Ignored |
| U | 21 | 15 | Deletes line where the cursor is |
| V | 22 | 16 | Ignored |
| W | 23 | 17 | Ignored |
| X | 24 | 18 | Ignored |
| Y | 25 | 19 | Ignored |
| Z | 26 | 1A | Ignored |
| [ | 27 | 1B | Ignored |
| / | 28 | 1C | Cursor right |
| ] | 29 | 1D | Cursor left |
| ^ | 30 | 1E | Cursor up |
| – | 31 | 1F | Cursor down |
| DEL | 127 | 7F | Deletes character where cursor is |

# BASIC COMMAND LIST

| Commands | | |
|---|---|---|
| AUTO | AUTO [start], [, increment] | Automatic line numbering to speed up text entry. |
| CONT | CONT | Continues execution after STOP statement or Control-STOP. |
| DELETE | DELETE line range | Erases groups of lines from memory. |
| LIST/LLIST | LIST [line num] [– line num]<br>LLST [line num] [– line num] | Displays your program on the screen.<br>Displays your program on the printer. |
| NEW | NEW | Erases all of your program and does a CLEAR. |
| RENUM | RENUM [new] [, old] [, increment] | Renumbers lines in memory. |
| RUN | RUN [<line number devfilename>] | Starts execution of program; enters run mode. |
| SAVE/LOAD<br>MERGE | SAVE devfilename<br>LOAD devfilename [, R]<br>MERGE devfilename | Saves program to tape in ASCII text format.<br>Loads program from tape; must be in ASCII text format.<br>Adds a program from tape in ASCII text format to one in RAM. |
| BASE (System numeric variable | BASE (tabentry) | Allows VRAM locations for VDP tables to be set, all SCREENs.<br>  <br> |
| BSAVE/BLOAD | BSAVE devfilename, start addr, end [, run addr]<br>BLOAD devfilename [, runoption] [, offsetaddr] | Saves a block of memory to tape in pure binary image format.<br>Loads into RAM a binary image stored on tape. |
| CSAVE/CLOAD<br>CLOAD? | CSAVE filename, speed<br>CLOAD [filename]<br>CLOAD? [filename] | Saves program to tape in internal format.<br>Loads program from tape; must be in internal format. |
| TRON/TROFF | TRON<br>TROFF | Turns on line number trace during execution.<br>Turns off line number trace during execution. |
| **Statements** | | |
| CLEAR | CLEAR (string size, [, freespace]) | Reserves RAM for string space and/or non-BASIC use; and also erases all variables, open files, etc. |
| CALL | CALL routine name [(parameter list)] | Activates an expanded BASIC statement capability. |
| CLOSE | CLOSE ([#] bufnum) (, [#] bufnum) | Ends I/O with specified file number. |
| DATA | DATA element ], element] | Specifies list of internal data items. |
| DIM | DIM varname [, varname] | Defines, reserves, and initializes arrays. |
| DEFINT<br>DEFSNG<br>DEFDBL<br>DEFSTR | DEFINT vartype range [, range]<br>DEFSNG vartype range [, range]<br>DEFDBL vartype range [, range]<br>DEFSTR vartype range [, range] | Defines default variable type. |
| DEFFN | DEFFN varname [(argvar [, argvar])] = expression | Specifies user-defined functions. |
| DEF USR | DEF USR [digit] = intexpr | Specifies starting location of user-defined machine-language function. |
| ERASE | ERASE array name [, array name] | Deletes the specified array. |
| END | END | Finishes execution, returns to direct mode. |
| ERROR | ERROR errnum | Statement which will cause any error to occur. |
| FOR ~ NEXT | FOR variable = start TO stop [STEP increment]<br>NEXT variable | Loop statement; changes value of loop control variable ends a loop started with a FOR statement. |
| GOSUB ~<br>RETURN | GOSUB line number<br>RETURN | Calls new line number.<br>Ends a subroutine, returns to statement after GOSUB. |
| GOTO | GOTO line number | Jumps to new line number. |
| IF ~ THEN/<br>IF ~ GOTO | If conditional expr THEN statement list<br>If conditional expr GOTO line number | Selects different options based on condition. |
| IF ~ THEN ~<br>ELSE | IF conditional expr THEN statement list<br>ELSE statement list | Selects different options based on condition. |

| | | |
|---|---|---|
| IF ~ GOTO ~ ELSE | IF conditional expr GOTO line number<br>IF conditional expr ELSE statement list | Selects different options based on condition. |
| INPUT | INPUT [<# filenum,>] variable list "prompt" | Reads in data items; must be in proper format. |
| KEY/KEY LIST | KEY <keynum, stringexpr><br>KEY LIST | Re-defines the use of the special function key.<br>KEY LIST lists on the screen entire text of all 10 function keys. |
| LINE INPUT | LINE INPUT [<# filenum,>] string var "stcons"; | Returns entire line of input, unformatted. |
| LET | [LET] variable expression | General variable assignment statement; the LET is optional. |
| MAXFILES | MAXFILES = numexpr | Specifies number of I/O files to reserve space for. |
| MID $ | MID $ (str var, start char [, length]) = strexpr | In place replacement of string variable with new value. |
| ON ERROR GOTO | NO ERROR GOTO line number | Specifies error trapping and location of handler. |
| ON GOTO/ GOSUB | ON numexpr <GOTO> list of line numbers<br>ON numexpr <GOSUB> list of line numbers | Case statement, does a GOTO based on variable value.<br>Case statement, does a GOSUB based on variable value. |
| ~ON/OFF/STOP | KEY (keynum) ON/OFF/STOP<br>STRIG (num) ON/PFF/STOP<br>STOP ON/OFF/STOP<br>SPRITE ON/OFF/STOP<br>INTERVAL ON/OFF/STOP | Specifies function key-based interrupt.<br>Specifies joystick trigger interrupt.<br>Specifies Control-Stop interrupt.<br>Specifies sprite collision interrupt.<br>Specifies timer-based interrupt. |
| ON ~ GOSUB | ON <INTERVAL> = ticks<br>ON <KEY> GOSUB line num [, line num]<br>ON <SPRITE> GOSUB line num [, line num]<br>ON <STOP> GOSUB line num [, line num]<br>ON <STRIG> GOSUB line num [, line num] | Defines location of interrupt handler. |
| OPEN | OPEN devfilename [FOR <APPEND>] AS [#] filenum<br>OPEN devfilename [FOR <INPUT> ] AS [#] filenum<br>OPEN devfilename [FOR <OUTPUT>] AS [#] filenum | Associates file number with device name; initializes.<br>CAS : Cassette tape<br>CRT : CRT display<br>GRP : Graphics screen<br>LPT : Printer |
| OUT | OUT address, data | Sends data to Z-80 output port. |
| POKE | POKE loc, data | Stores data in any RAM location. |
| PRINT/LPRINT | PRINT [filenum,] print list<br>LPRINT [filenum,] print list | Sends data to file I/O device/sends data to printer. |
| PRINT/LPRINT USING | PRINT USING [filenum,] [format;] print list<br>LPRITN USING [filenum,] [format;] print list | Option on PRINT statements for formatted output. |
| PRINT #/ INPUT # | PRINT [# filenum,] print list<br>INPUT [# filenum,] variable list | Sends data to text display screen.<br>Returns prompted input, must be in proper format. |
| READ | READ variable [, variable] | Inputs data from DATA statement to variable. |
| REM | REM any text | Statement that is totally documentary. |
| RESTORE | RESTORE [line number] | Resets pointer to allow DATA to be re-READ. |
| RESUME | RESUME<br>RESUME 0<br>RESUME NEXT<br>RESUME [line number] | Specifies end of error handler and where to continue. |
| STOP | STOP | Temporarily stops execution with message, may be restarted. |
| SWAP | SWAP <numeric variable, numeric variable><br>String variable, string variable | Switches values of two variables; fast and totally in place. |
| TIME | TIME = numexpr | MSX BASIC keeps an internal 16-bit counter which it continually updates at 60 times per second.<br>Sets the system clock. |
| WAIT | WAIT port, and [, xor] | Reads Z-80 input port and waits until condition is met. |
| VDP (System numeric variable) | VDP (reg num) | Allows access to actual VDP registers. |
| **Graphics and Sound Statements** | | |
| BEEP | BEEP no parameters | Sounds alarm beep and resets all sound output. |
| CIRCLE | CIRCLE [@] [STEP] (x, y), radius [, color] [startangle], [, endangle] [, aspect] | Draws circles, arcs, wedges, and ovals. |
| CLS | CLS | Clears screen to background color. |

| | | |
|---|---|---|
| COLOR | COLOR [colornum] [, colornum] [, colornum] | Sets default foreground; background; (not SCREEN 0) border color.<br>Here are the color numbers:<br>0 TRANSPARENT 8 MEDIUM RED<br>1 BLACK 9 LIGHT RED<br>2 MEDIUM GREEN 10 DARK YELLOW<br>3 LIGHT GREEN 11 LIGHT YELLOW<br>4 DARK BLUE 12 DARK GREEN<br>5 LIGHT BLUE 13 MAGENTA<br>6 DARK RED 14 GREY<br>7 CYAN 15 WHITE |
| DRAW | DRAW string expr | Uses Graphics Macro Language to draw entire objects. |
| LINE | LINE [[@] [STEP[ (x1, y1) – [@] [SETP] (x2, y2) [[, color], <B> <BF>] | Draws lines, hollow boxes, filled-in boxes. |
| LOCATE | LOCATE [x], [y], [switch] | Moves text cursor and turns it on or off. |
| PUT SPRITE | PUT SPRITE sprnum [, [@] [STEP] (x, y)] [, color] [, sprimage] | Actually controls display of 32 possible sprites. |
| PAINT | PAINT [@] [STEP] (x, y) [, color] [, strexpr] | Fills any enclosed area with any color. |
| PLAY | PLAY [strexpr] [, strexpr] [, strexpr] | Uses Music Macro Language to play 3-part background music. |
| PSET/PRESET | PSEST [@] [STEP] (x, y) [, color]<br>PRESET [@] [STEP] (x, y) [, color] | Resets any point on screen to background color.<br>Sets any point on screen to foreground color. |
| SCREEN | SCREEN [mode] [, sprite] [, key click] [, tape speed] , [, printer] | Sets display screen type and sprite size<br>SCREEN MODE<br>0 : Text mode (40 x 24 characters)<br>1 : Text mode (32 x 24 characters)<br>2 : Highest resolution mode<br>3 : Multicolor mode<br>SPRITE SIZE<br>0 : 8 x 8 pixels 2 : 16 x 16 pixels<br>1 : 8 x 8 pixels (large) 3 : 16 x 16 pixels (large) |
| SPRITE $ | SPRITE $ (num) = stringexpr | Accesses 64 or 256 possible sprite data patterns. |
| VPOKE | VPOKE address, data | Writes data directly to any location in VRAM. |
| ON/OFF | KEY : ON/OFF<br>MOTOR ON/OFF | Turns function key prompt line on or off.<br>Turns cassette motor on and off. |
| SOUND | SOUND register, setting | Allows access to actual PSG registers. |
| WIDTH | WIDTH size | Sets width of text screens.<br>numeric expression in range<br>1 – 32 if SCREEN 1, or 1 – 40 if SCREEN 0 |
| **String Functions** | | |
| BIN $ | BIN $ (integer expression) | Converts integer to binary notation in character string. |
| POINT | POINT (x, y) | Returns color of any point on screen. |
| VPEEK | VPEEK (address) | Reads any location in VRAM.<br>Address :: = a numeric expression in range 0 – 16383 |
| STICK | STICK (which) | Reads digital joystick<br>which :: = numeric expression in range<br>0 – 3, 0 = keyboard, 1 and<br>2 = joystick sockets 1 and 2. |
| STRIG | STRIG (num) <ON/OFF/STOP> | Reads trigger buttons from joystick. |
| PDL | PDL (choice) | Reads game paddles (knobs). |
| PAD | PAD (select) | Reads graphics pad (tablet). |
| TIME | TIME | Returns the system clock. |

| Numeric Functions | | |
|---|---|---|
| ABS | ABS (numexpr) | Absolute value. |
| ASC | ASC (stringexpr) | Converts string character to corresponding character code. |
| ATN | ATN (numexpr) | Arctangent; inverse tangent of angle given in radians. |
| CDBL | CDBL (numexpr) | Converts to double-precision BCD-format type. |
| CHR $ | CHR $ (numexpr) | Converts numeric value to corresponding one-byte character. |
| CINT | CINT (numexpr) | Converts to 16-bit signed integer type. |
| COS | COS (radangle) | Cosine of angle in radians. |
| CSNG | CSNG (numexpr) | Converts to single-precision BCD-format type. |
| CSRLIN | CSRLIN | Returns row text cursor is on. |
| EXP | EXP (exponent) | E raised to the power of n. |
| EOF | EOF (filenum) | Indicates whether end-of-file mark reached yet. |
| ERL | ERL | Contains line number of last error. |
| ERR | ERR | Contains error number of last error. |
| FRE | FRE (dummy argument) | Unused RAM available or unused string space available. |
| FIX | FIX (numexpr) | Strips off any fractional part, returning whole number only. |
| HEX $ | HEX $ (numexpr) | Converts integer to hex notation in character string. |
| INKEY $ | INKEY $ | Returns the character (or a null) string from the keyboard. |
| INPUT $ | INPUT $ (number [, [ ] filenum]) | Returns specified number of raw, unechoed bytes. |
| INSTR | INSTR ([start,] string, substring) | Position of substring in a string. |
| INT | INT (numexpr) | Rounds down number to next lower whole part. |
| LEFT $ | LEFT $ (string expr, length) | Substring of specified number of characters, from left. |
| LEN | LEN (string expr) | Length of string. |
| LOG | LOG (numarg) | Natural (base e) logarithm |
| LPOS | LPOS (1) | Return printer column position. |
| MID $ | MID $ (strexpr, start char [, length]) | Extracts specified substring from anywhere in string. |
| OCT $ | OCT $ (integer expression) | Converts integer to octal notation in character string. |
| PEEK | PEEK (addr) | Reads data from any memory location. |
| POS | POS (arg) | Returns column text cursor is on. |
| RIGHT $ | RIGHT $ (strexpr, numexpr) | Substring of specified number of characters, from right. |
| RND | RND (numexpr) | Pseudo random number generator. |
| SGN | SGN (numexpr) | Signum function. |
| SIN | SIN (numexpr) | Sine of angle in radians. |
| SPACE $ | SPACE $ (length) | Generates string of any length containing blank spaces. |
| SPC | PRINT . . . SPC (length) | PRINT command function producing blank spaces. |
| SQR | SQR (numexpr) | Square root. |
| STR $ | STR $ (numexpr) | Converts number to character string containing the number. |
| STRING $ | STRING $ (len, <numexpr/stringxpr>) | Generates string with repeated characters. |
| TAB | PRINT . . . ; TAB (column); . . . | PRINT command function producing blank spaces to any point. |
| TAN | TAN (angle) | Tangent of angle in radians. |
| USR | USR [digit] (expression) | Invokes user-defined machine-language that is previously set up function. |
| VAL | VAL (strexpr) | Converts character string containing digits to number. |
| VARPTR | VARPTR (<variable/#file number>) | Returns pointer to location of variables and files in memory. |

# DISK BASIC COMMAND LIST

| | | |
|---|---|---|
| BLOAD | BLOAD file name [, R] [, offset]<br>[, S] | Load a binary format file. |
| BSAVE | BSAVE file name ,start ,end [, execution]<br>[S] | Save a binary format file. |
| CLOSE | CLOSE [[#] file number [, [#] file number] ...] | Close files. |
| COPY | COPY source file name [TO "destination file name] | Copy files. |
| CVI/CVS/CVD | CVI (2-byte string) CVS (4-byte string)<br>CVD (8-byte string) | Convert string values to numeric values. |
| DSKF | DSKF (drive number) | Return the free space of a floppy disk. |
| EOF | EOF (file number) | Test if end-of-file is reached. |
| FIELD | FIELD [#] file No. ,field 1 AS string variable 1<br>[field 2 AS string variable 2]... | Allocate the filed buffer to variables. |
| FILES | [L] FILES [file name] | Display the names of disk files. |
| FORMAT | CALL FORMAT | Format a floppy disk. |
| GET | GET [#] file number [, record number] | Read a record from a random disk file. |
| INPUT # | INPUT# file number, variable list | Read data from a sequential disk file. |
| INPUT $ | INPUT $ (length, [#] file number) | Return a string of specified length, read from a disk file. |
| KILL | KILL file name | Delete a file from a disk. |
| LINE INPUT # | LINE INPUT # file number string variable | Read an entire line from a sequential disk file to a string variable. |
| LOAD | LOAD file name [, R] | Load a BASIC program into memory. |
| LOC | LOC (file number) | Return the current record number. |
| LOF | LOF (file number) | Return the length of a file. |
| LSET. RSET | LSET string variable = string expression<br>RSET string variable = string expression | Move data from memory to a random file buffer. |
| MERGE | MERGE file name | Merge a specified disk file into the program in memory. |
| MKI $<br>MKS $<br>MKD $ | MKI $ (integer expression)<br>MKS $ (single precision expression)<br>MKD $ (double precision expression) | Convert numeric values to string values. |
| NAME | NAME old file name AS new file name | Change the name of a disk file. |
| OPEN | OPEN file name [FOR mode] AS [#] file number<br>[LEN = record length] | Assign a file buffer for I/O. |
| PRINT #<br>PRINT # USING | PRINT # file number ,[USING string expression ;]<br>[expression] ... | Output data to a sequential data file. |
| PUT | PUT [#] file number [ ,record number] | Write a record from a random buffer to a random file. |
| RUN | RUN [file name [ ,R]]<br>[line number] | Load a program file from a disk and RUN that program. |
| SAVE | SAVE file name [ ,A] | Save a BASIC program on memory as a disk file. |
| SYSTEM | CALL SYSTEM | Return control to MSX-DOS |
| VARPTR | VARPTR {[#] file number (variable name)} | Return the address of the variable, or the address of FCB. |

# ERROR MESSAGES

| ERROR MESSAGES | MEANING/CAUSE |
|---|---|
| NEXT without FOR | A variable in a NEXT statement does not correspond to any previously executed, unmatched FOR statement variable. |
| Syntax error | A line is encountered that contains some incorrect sequence of characters (such as an unmatched parenthesis, misspelled command or statement, incorrect punctuation, etc.) |
| RETURN without GOSUB | A RETURN statement is encountered for which there is no previous, unmatched GOSUB statement. |
| Out of DATA | A READ statement is executed when there are no DATA statements with unread data remaining in the program. |
| Illegal function call | A parameter that is out of range is passed to a math or string function. An "Illegal function call" error may also occur as the result. |
| Overflow | The result of a calculation is too large to be represented in BASIC number format. If underflow occurs, the result is zero and execution continues without an error. |
| Out of memory | A program is too large, or has too many FOR loops, GOSUBs, or too many variables. |
| Undefined line number | A nonexistent line is referenced in a GOTO, GOSUB, IF ... THEN ... ELSE, or DELETE statement. A new program line that contains only the line number, also causes this error. |
| Subscript out of range | An array element is referenced either with a subscript that is outside the dimensions of the array or with the wrong number of subscrips. |
| Radimensioned array | Two DIM statements are given for the same array; or, a DIM statement is given for an array after the default dimension of 10 has been established of that array. |
| Division by zero | A division by zero is encountered in an expression; or the operation of involution results in zero being raised to a negative power. |
| Illegal direct | A statement that is illegal in direct mode is entered as a direct mode command. |
| Type mismatch | A string variable name is assigned a numeric value or vice versa; a function that expects a numeric argument is given a string argument, or vice versa. |
| Out of string space | String variables have caused BASIC to exceed the amount of free memory remaining which has been allocated for string operation by CLEAR statement. |
| String too long | An attempt is made to create a string more than 255 characters long. |
| String formula too complex | A string expression is too long or too complex. The expression should be broken into smaller expressions. |
| Can't continue | An attempt is made to continue a program that:<br>1. Has halted due to an error.<br>2. Has been modified during a break in execution.<br>3. Does not exist. |
| Undefined user function | A USR function is called before the function definition (DEF statement) is given. |
| Device I/O error | An error occured on an I/O device operation. |
| Verify error | The contents of memory and the contents of a file turn out to be different. This error may occur when using CLOAD? command. |
| No RESUME | An error handling routine is entered but contains no RESUME statement. |
| RESUME without error | A RESUME statement is encountered before an error handling routine is entered. |
| Unprintable error | An error message is not available for the condition that exists. |
| Missing operand | An expression contains an operator with no operand following it; a command/statement is given without its compulsory parameters. |
| Line buffer overflow | An attempt is made to INPUT a line that contains more than 255 characters. |
| Field overflow | A FIELD statement is attempting to allocate more bytes than were specified for the record length of a random file. |
| Internal error | An internal malfunction has occurred in MSX BASIC. Report to Microsoft the conditions under which the message appeared. |
| Bad file number | A statement or command references a file with a file number that is not OPEN or is out of the range of file numbers specified at initialization. |
| File not found | A LOAD KILL, NAME, or OPEN statement/command references a file that does not exist on the current disk. |
| File already open | A sequential output mode OPEN statement is issued for a file that is already OPEN; or a KILL statement is given for a file that is OPEN. |
| Input past end | An INPUT statement is executed after all the data in the file has been INPUT, or for a null (empty) file. To avoid this error, use the EOF function to detect the end of file. |
| Bad file name | An illegal form is used for the file name with a LOAD, SAVE, KILL, or OPEN statement (e.g., a file name with too many characters). |
| Direct statement in file | A direct statement is encountered while LOADing and ASCII file. The LOAD is terminated. |
| Sequential I/O only | A GET, or PUT statement is used with a file that has been OPENed as a sequential file. |
| File not OPEN | An I/O command/statement is used with a file that has not been OPENed. |

# DISK BASIC ERROR MESSAGES

| ERROR MESSAGES | MEANING/CAUSE |
|---|---|
| Bad FAT | The file allocation table (FAT) is not in order. Probably the diskette is not initialized by FORMAT command. |
| Bad drive name | An illegal drive name is used. |
| Bad file mode | An attempt is made to use PUT, GET, or LOF with a sequential file, to LOAD a random file, or to execute an OPEN statement with an improper file mode. |
| Badnsector number | Should not occur in the final version of MSX DISK BASIC. |
| Disk full | All disk storage space is in use.<br>When a Disk full error occurs and you press RETURN , it will return to command mode. However, data or program that was still unwritten to the disk when the error occurred will not be saved. |
| Disk I/O error | An unrecoverable error occurred during a disk I/O operation. |
| Disk offline | The disk drive is off line. |
| Disk write protected | The disk has a write protect tab intact, or is one that cannot be written to. |
| Field overflow | A FIELD statement is attempting to allocate more bytes than were specified for the record length of a random file. |
| File already exists | The file name specified in a NAME statement is identical to a filename already in use on the disk. |
| File not found | A LOAD, KILL, NEME, or OPEN statement/command references a file that does not exist on the current disk. |
| File still open | A file is not CLOSED yet. |
| Rename across disks | An attempt was made to rename a file with a new drive designation. This is not allowed. |
| Sequential I/O only | A GET, or PUT statement is used with a file that has been OPENed as a sequential file. |
| Too may files | An attempt is made to create a new file (using SAVE or OPEN) when all 255 directory entries are full. |

# TROUBLESHOOTING

Check the following items if your CX5MII appears to malfunction during use. If it cannot be returned to normal working order, disconnect the power plug and contact your nearest service center.

| PROBLEM | CAUSE | CURE |
|---|---|---|
| The POWER lamp is not lit when the POWER switch is turned ON. | The unit is not connected to a wall outlet, or the wall outlet is "dead". | Connect the unit to a wall outlet, or check the outlet voltage. |
| Nothing appears on the screen. | There is no power to the monitor or TV. | Turn on the power. |
| | The connections are improper. | Connect the units correctly. |
| | The ROM cartridge is incorrectly inserted. | Insert the ROM cartridge correctly. |
| | The TV tuner is not set to the same channel as the TV adaptor. | Match the channels of the TV and the TV adaptor. |
| | The fine tuning, brightness and contrast of the TV are improperly adjusted. | Adjust the fine tuning, brightness and contrast. |
| The reception signal is weak. | The TV turner is not set to the same channel as the RF adaptor. | Match the channels of the TV and the TV adaptor. |
| | The fine tuning of the TV requires adjustment. | Fine tune the TV. |
| | The connections of the TV adaptor are incorrect. | Connect the TV adaptor correctly. |
| The ROM cartridge does not operate. | The cartridge is not fully inserted. | Fully insert the cartridge. |
| | The terminals of the cartridge are dirty. | Clean the terminals. |
| A program cannot be loaded from cassette tape. | The cables of the cassette recorder are incorrectly connected. | Correctly connect the cables. |
| | The volume of the cassette recorder is too low. | Raise the volume of the cassette recorder. |
| | The phase is incorrect (for units having adjustable phase). | Correctly set the phase. |
| The CX5MII "hangs" or stops during use. | Momentary loss of power. The POWER switch is turned OFF. | Turn the power on. Operation of the unit will resume, but any programs stored in the unit will have been erased. |
| | The power cord is disconnected. Interference free other electric devices entering the power cord. | Use a wall outlet where the effects of vacuum cleaners, microwave ovens, etc. are not present, or use an AC line filter. |
| | The connection of peripheral devices is incorrect. | Connect the peripheral devices correctly. |

# SPECIFICATIONS

1) CPU

Z80A (Clock frequency 3.57954MHz)

2) Memory

| | | |
|---|---|---|
| Main memory | 64 KB (with memory mapper) | |
| Video RAM | 16 KB | |
| ROM | 48 KB | |
| | MSX-BASIC Ver. 1.0 | 32 KB |
| | Sub ROM | 16 KB |

3) Keyboard

73 keys

| | |
|---|---|
| Alpha-numeric keys and graphic characters | x 49 |
| Control codes, etc | x 15 |
| Cursor movement keys | x 4 |
| Function keys | x 5 |

4) Video Out Specifications

| | |
|---|---|
| Front: | Alpha-numeric and graphic patterns 256 characters with 8 x 8 dot matrices |
| Color graphics: | 16 colors with 256 x 192 resolution 32 sprites |
| Characters: | 40/80 characters per line (80 only with Green CRT or RGB TV) |
| Video output: | RGB, RF, Video (CX5MIIF has only RGB.) |

5) Music Function

8 octaves 3 notes and noise

6) Slots

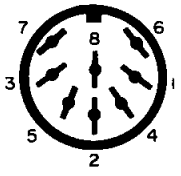
| | |
|---|---|
| Upper slot | 2 pcs. |
| Side slot | 1 pcs. |
| External (front) slot | 1 pcs. |

7) Vundle software

FM Sound Synthesizer Unit II
FM Voicing Program II (Plug into External slot)

8) Cassette Data Recorder Interface

FSK 1200 BPS or 2400 BPS
8 pin DIN connector

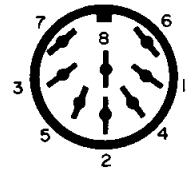
| Pin# | Signal | Connection |
|---|---|---|
| 1 | GND |  |
| 2 | GND | |
| 3 | GND | |
| 4 | CMTOUT | |
| 5 | CMTIN | |
| 6 | REM+ | |
| 7 | REM− | |
| 8 | GND | |



9) Video/Audio Out (Except CX5MIIF)

Connect with RCA type pin connection cables.

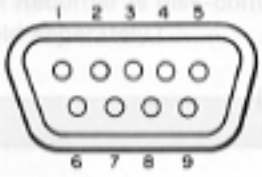
9) RGB Out CX5MIIF

| Pin# | Signal | Connection |
|---|---|---|
| 1 | GND |  |
| 2 | SOUND | |
| 3 | AV | |
| 4 | V | |
| 5 | YS | |
| 6 | R | |
| 7 | G | |
| 8 | B | |

10) Joystick Interface

9 pin type-D connector x 2 TTL connection

| Pin# | Signal | Connection |
|---|---|---|
| 1 | FWD | |
| 2 | BACK | |
| 3 | LEFT | |
| 4 | RIGHT | |
| 5 | +5V | |
| 6 | TRG1 | |
| 7 | TRG2 | |
| 8 | OUT | |
| 9 | GND | |

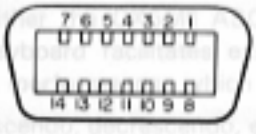



11) Printer Interface

8 bits parallel Centronics 14 pins TTL connection

Following conditions need to be met to produce hard copies.
1) More than 640 dots/line [or 480 dots/line so long as a double mode (960 dots/line) can be selected by ESC + "P"]
2) The bit image command to be ESC + "S".

| Pin# | Signal | Connection |
|---|---|---|
| 1 | PSTB | |
| 2 | PDB0 | |
| 3 | PDB1 | |
| 4 | PDB2 | |
| 5 | PDB3 | |
| 6 | PDB4 | |
| 7 | PDB5 | |
| 8 | PDB6 | |
| 9 | PDB7 | |
| 10 | NC | |
| 11 | BUSY | |
| 12 | NC | |
| 13 | NC | |
| 14 | GND | |




12) ROM Cartridge Slot (game slot)

| No. | Name | I/O | No. | Name | I/O | No. | Name | I/O |
|---|---|---|---|---|---|---|---|---|
| 1 | CS1 | O | 2 | CS2 | O | 3 | CS12 | O |
| 4 | SLTSL | O | 5 | N/C | – | 6 | RFSH | O |
| 7 | WAIT | I | 8 | INT | I | 9 | MI | O |
| 10 | BUSDIR | I | 11 | IORQ | O | 12 | MERQ | O |
| 13 | WR | O | 14 | RD | O | 15 | RESET | O |
| 16 | N/C | – | 17 | A9 | O | 18 | A15 | O |
| 19 | A11 | O | 20 | A10 | O | 21 | A7 | O |
| 22 | A6 | O | 23 | A12 | O | 24 | A8 | O |
| 25 | A14 | O | 26 | A13 | O | 27 | A1 | O |
| 28 | A0 | O | 29 | A3 | O | 30 | A2 | O |
| 31 | A5 | O | 32 | A4 | O | 33 | D1 | I/O |
| 34 | D0 | I/O | 35 | D3 | I/O | 36 | D2 | I/O |
| 37 | D5 | I/O | 38 | D4 | I/O | 39 | D7 | I/O |
| 40 | D6 | I/O | 41 | GND | – | 42 | CLOCK | O |
| 43 | GND | – | 44 | SW1 | – | 45 | +5V | – |
| 46 | SW2 | – | 47 | +5V | – | 48 | −12V | – |
| 49 | SUNDIN | I | 50 | −12V | – | | | |

MSX standard 50 pin connector

13) Extension Side Slot Pin Assignment (60 pin connector)

| No. | Name | I/O | No. | Name | I/O | No. | Name | I/O |
|---|---|---|---|---|---|---|---|---|
| 1 | SOUND OUT | O | 2 | GND | | 3 | GND | |
| 4 | Phase Control | I | 5 | Y | O | 6 | B-Y | O |
| 7 | C VIDEO | O | 8 | R-Y | O | 9 | EXT CLOCK | I |
| 10 | CLOCK INT/EXT | I | 11 | CS1 | O | 12 | CS2 | O |
| 13 | CS12 | O | 14 | SLTSL | O | 15 | N/C | – |
| 16 | RFSH | O | 17 | WAIT | I | 18 | INT | I |
| 19 | MI | O | 20 | NO CONNECTION | – | 21 | IORQ | O |
| 22 | MERQ | O | 23 | WR | O | 24 | RD | O |
| 25 | RESET | O | 26 | N/C | – | 27 | A9 | O |
| 28 | A15 | O | 29 | A11 | O | 30 | A10 | O |
| 31 | A7 | O | 32 | A6 | O | 33 | A12 | O |
| 34 | A8 | O | 35 | A14 | O | 36 | A13 | O |
| 37 | A1 | O | 38 | A0 | O | 39 | A3 | O |
| 40 | A2 | O | 41 | A5 | O | 42 | A4 | O |
| 43 | D1 | I/O | 44 | D0 | I/O | 45 | D3 | I/O |
| 46 | D2 | I/O | 47 | D5 | I/O | 48 | D4 | I/O |
| 49 | D7 | I/O | 50 | D6 | I/O | 51 | GND | – |
| 52 | CLOCK | O | 53 | GND | – | 54 | SW1 | – |
| 55 | +5V | O | 56 | SW2 | – | 57 | +5V | – |
| 58 | +12V | – | 59 | SOUND IN | I | 60 | −12V | – |

14) General Specifications (CX5MIIU, C)

| | |
|---|---|
| AC power supply: | AC 120V ± 10% 50/60Hz |
| Power consumption: | max 27 watts |
| Operation condition: | temperature 0-35°C |
| | humidity less than 80% |
| Dimensions: | 440W x 98H x 285D (mm) |
| | (17-3/10" x 3-9/10" x 11-2/5") |
| Weight: | 3.5 kg (25.32 lb) |

14) General Specifications (Except CX5MIIU, C)

| | |
|---|---|
| AC power supply: | AC 220V ± 10% 50/60Hz |
| | (Only the CX5MIIB has a voltage selector.) |
| Power consumption: | max 27 watts |
| Operation condition: | temperature 0-35°C |
| | humidity then 80% |
| Dimensions: | 440W x 98H x 285D (mm) |
| | (17-3/10" x 3-9/10" x 11-2/5") |
| Weight: | 3.5 kg (25.32 lb) |

15) FM sound Synthesizer Unit

| | |
|---|---|
| Sound generator: | FM Sound Generator |
| | 4 operators 8 algorithms |
| Polyphony: | 8 notes simultaneous |
| Internal voices: | 46 presets |
| Connections: | Audio output (L, R) |
| | MIDI-IN, MIDI-OUT |
| | Music keyboard connector |
| Audio output: | |
| Level | −9 dBm |
| | FLUTE voice, 440 ~ 880 Hz |
| | 8 note simultaneous output |
| Impedance | 1.8 kΩ |
| Temperature range: | 0 ~ 35°C |
| Humidity range: | 20 ~ 80% |
| Dimensions: | 126W x 150D x 26H mm |
| | (5" x 5-9/10" x 1") |
| Weights: | 330 g (0.7 lb) |

16) Included Accessories (Except CX5MIIF)

RF Cable
Cassette Interface Cable
Antenna Switch Box
FM Voicing Program II

16) Included Accessories (CX5MIIF)

RGB Connector
Cassette Interface Cable
FM Voicing Program II

# CX5MII SOFTWARE AND PERIPHERAL OPTIONS

## MIDI Recorder YRM-301

This software turns your CX5MII into a 4-track real time MIDI recorder. You can record up to 4 separate tracks of MIDI data (including velocity and control change information). Each of these tracks can be edited separately. You can punch-in on even just 1 note, add, delete or copy measures, and merge tracks together.
Just as with multi-track tape recording, you can "pingpong" several tracks onto one, and continue recording on the tracks that have opened up. And because you are recording only digital information, there will never be any noise build or signal loss. Since the MIDI Recorder is disk-compatable, all data can be saved onto or loaded from a floppy disk. (Floppy Disk Drive FD-05, sold seperately.)

## RX Editor YRM-302

This software greatly expands the capabilities of your Yamaha RX Digital Rhythm Machine. It lets you edit RX pattern and song data using the CX5MII, and displays all parameters and data on the screen for immediate visual conformation. The RX Editor also gives you many new capabilities that the RX by itself does not have.
For instance, you can name each pattern with a name of up to 6 letters. For most commands, you don't even have to touch the CX keyboard. Simply point to the command on the screen by moving the mouse, and click the button. (MU-01 MSX Mouse sold separately.) You can move each note forward or backward in steps of a 1/96 note, to create any subtle nuance. Also, when using the RX11, you can program separate volume and pan settings for each note. The memory holds 13,000 bytes, and since the RX Editor is disk-compatible, all song and pattern data can be quickly saved on or loaded from a floppy disk. (FD-05 Floppy Disk Drive sold separately.)

## FM Music Composer YRM-101

## FM Music Composer YRM-501

When connected to the Yamaha CX5MII Music Composer equipped with the Yamaha FM Sound Synthesizer unit, the Yamaha FM Music Composer software cartridge enables computer aided music composition and orchestration, and full performance control of all compositions. Notes are entered directly onto a music score displayed on the video monitor screen, and on-screen indication of phrasing, dynamics and performance control data is also provided. (YRM-501 allows you to store data on floppy disks as well.)

FM Music Features

- Music composition with up to 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 CX5MII ASCII keyboard or from a Yamaha YK-01 or YK-10/YK-20 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 or data memory cartridge (UDC-01).

## FM Voicing Program YRM-102

## FM Voicing Program YRM-502

The Yamaha FM Voicing Program software cartridge permits you to use the CX5MII to create synthesizer voices and play them back by means of the CX5MII's built-in FM Sound Synthesizer unit. While a rich assortment of preset voices is included with the FM Sound Synthesizer unit, the FM Voicing Program further expands the creative potential of the CX5MII by permitting creation of new voices, as well as modification of existing voices.

FM Voicing Program Features

- The FM Voicing Program enables you to modify all the voices which come preset into the FM Sound Synthesizer unit. It also enables you to create entirely new voices from scratch.
- Voices are created and edited by entering data from the CX5MII computer keyboard. All data is graphically displayed on the monitor screen. Voice creation can also be audibly monitored while editing by playing a Yamaha Music Keyboard which is connected to the computer.
- All voice data (the parameters of voices you edit or create) can be saved on cassette tape or data memory cartridge (UDC-01). The voice data can be used for performance when the CX5MII is equipped with the Yamaha FM Music Composer or the FM Music Macro program cartridges. (The YRM-502 allows you store data on floppy disks as well.)
- All voice data, and a complete listing of the names of all voices, can be converted to "hard copy" with an optional external printer.

## DX7 Voicing Program YRM-103

## DX9 Voicing Program YRM-105

## TX7 Voicing Program YRM-304

## DX21 Voicing Program YRM-305

The DX/TX Voicing Program software cartridge enables the CX5MII computer to be used for editing or creating voices for the Yamaha DX series Digital Programmable Algorithm Synthesizer and the Yamaha TX7 FM Tone Generator. The DX/TX is connected to the CX5MII via the FM Sound Synthesizer MIDI terminals. The DX/TX Voicing Program provides extremely efficient voice programming, with on-screen graphic displays of all voicing parameters.

DX/TX Voicing Program Features

- All DX/TX voicing parameters are displayed on the screen for easier, more efficient voice programming. Envelope generator and keyboard scaling data can be displayed numerically and graphically, for real-time visual confirmation of these parameters as they are changed.
- LFO (Low Frequency Oscillator) settings and other voice-modifying parameters can also be stored in CX5MII memory, so each distinct voice will have its own characteristic setting.
- All voice data, and a full listing of all voices, can be converted to "hard copy" with an external printer, saved on cassette tape, and/or stored on UDC-01 Data Memory cartridges and DX/TX RAM cartridges. LFO settings and other voice modifying parameters can also be stored on external memory. (The YRM-304 & 305 allow you to store data on floppy disks as well.)
- Editing of voice data can be done from either the CX5MII or from the DX/TX itself.

## Yamaha FM Music Macro YRM-104

## Yamaha FM Music MacroII YRM-504

The Yamaha FM Music Macro software cartridge allows the voicing and performance potential of the Yamaha FM Sound Synthesizer unit to be used within the framework of an MSX Basic program. Versatile Basic commands are provided for voice selection, music composition, and automatic performance. These special commands are used in a Basic program along with the full range of commands available in MSX Basic, adding the vast potential of the Yamaha FM Sound Synthesizer unit to standard Basic programming. (The YRM-504 allows you to store data on floppy disks as well.)

Yamaha FM Music Macro Features

- Up to four different voices may be used for simultaneous performance, providing dynamic musical performance capability within a Basic program.
- Music may be composed with up to 8 separate parts.
- Preset rhythm patterns may also be selected and modified for automatic performance along with the other synthesized voices.
- For a wider range of expressive control, volume and pitch may also be modified during performance of an individual voice.
- Performance data can be output to Yamaha DX synthesizers and other MIDI compatible instruments.

## Yamaha Dot Impact Printer PN-101

The PN-101 is a compact and quiet 9 dot printer for the CX5MII or any MSX computer. It will accept fan-fold paper, roll or sheet paper, and will print up to 80 characters per line. When used with Yamaha music software, it will make hard copy of the screen display graphics. Printing speed is 40 characters per second.

## Yamaha 3.5 inch Floppy Disk Drive FD-05

The FD-05 is a compact and quiet disk drive for use with the CX5MII or any MSX computer. It uses the standard MSX 3.5 inch dual-side double-density disks, with a capacity of 1 megabyte per disk. (720K bytes when formatted) Data from Yamaha FDD-compatible software (such as MIDI Recorder YRM-301 and RX Editor YRM-302) can be quickly stored to or loaded from a disk.

NOTE:

Only printers specified as being MSX-compatible may be used with the CX5MII. Only joysticks, paddles, touch pads, and other peripheral devices specified as being MSX-compatible may be used with the CX5MII.

In addition to the ROM software cartridges made available by Yamaha, the CX5MII will also run any ROM software cartridge specified as being compatible with an MSX computer.

**SERVICE**

The CX5MII are supported by Yamaha's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest Yamaha dealer.

[ 8 Voices Polyphonic Synthesizer/Sequencer ]
Model SFG-05 MIDI Implementation Chart

Date : 10,Apr,1985
Version : 1.00

| Function ... | | Transmitted: Synthe. | Transmitted: Sequencer | Recognized: Solo | Recognized: Poly | Recognized: Seq. | Rh. | Remarks |
|---|---|---|---|---|---|---|---|---|
| Basic | Default | 1 | | 1 | 1* | same as #1 | x | * #2-#4 off |
| Channel | Changed | 1-16 | | 1-16 | 1-16 | | x | |
| Mode | Default | 3 | | 3 | | | x | |
| | Messages | x | | x | | | x | |
| | Altered | ********** | | x | | | x | |
| Note Number | | 36-84 | 0-127 | 0-127 | | | x | |
| | | ********** | | 0-127 | | | x | |
| Velocity | Note ON | x v=64 | o v=1-127 | o | | | x | |
| | Note OFF | x 9nH v=0 | | x | | | x | |
| After Touch | Key's | x | | x | | | | |
| | Ch's | x | | x | | | | |
| Pitch Bender | | x | | x | | | | |
| Control Change | ( 5) | x | | o | x | x | | Portamento Speed |
| | ( 7) | x | | o | o | x | | Volume |
| | (64) | x | | o | o | x | | Sustain ON/OFF |
| | (65) | x | | o | x | x | | Portamento ON/OFF |
| Prog Change | | x | | o 0-47 | | x | | |
| | True # | ********** | | 0-47 | | x | | |
| System Exclusive | | x | | x | | | | |
| System Common | Song pos | x | | x | | | | |
| | Song sel | x | | x | | | | |
| | Tune | x | | x | | | | |
| System Real Time | Clock | o(Internal Mode) | | o(MIDI Mode) | | | | |
| | Commands | o(Internal Mode) | | * o(MIDI Mode) | | | | * Except FBH |
| Aux Mes-sages | Local ON/OFF | x | | x | | x | | |
| | All Notes OFF | o(126,127,123) | | o(123) | | x | | |
| | Active Sense | x | | x | | x | | |
| | Reset | x | | x | | x | | |
| Notes | | In Split/Dual-Mode(of POLY Mode),MIDI Ch# of Inst#2 is same as Inst#1's<br>In order to clear all notes, we send [All Notes OFF (126,127,123)] | | | | | | |

Mode 1 : OMNI ON, POLY  Mode 2 : OMNI ON, MONO  o : Yes
Mode 3 : OMNI OFF, POLY  Mode 4 : OMNI OFF, MONO  x : No

SINCE 1887 YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

OMD-149EF 8592 Ⓘ Printed in Japan.