# MIDI GUITAR SYSTEM
IMG2010 MIDI GUITAR
MC1 MIDI CONTROLLER

Owner's Manual / Bedienungsanleitung / Mode d'emploi

Ibanez

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INHALT

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Welcome to the exciting new world of guitar-controlled synthesis! The Ibanez MIDI Guitar System takes advantage of the latest signal conversion technology and the MIDI interface standard to create a guitar controller-system that dramatically advances the state-of-the-art. You can now experience unparalleled synthesizer control with a new level of guitar-playing realism. This allows you to forget about the technical side of musical synthesis and play!

To realize all of the technical benefits of the Ibanez MIDI Guitar System, it is essential that you maintain system calibration. The calibration procedure is greatly simplified by extensive calibration software built into the MC1 MIDI Controller. Please take the time to follow these procedures completely, so that you will be familiar with them when an occassional recalibration is required. Also, to take full advantage of all of the features offered by the Ibanez MIDI Guitar System, read this manual thoroughly. Then get ready to play things you never played before!

2 FEATURES

The Ibanez MIDI Guitar System encorporates many design breakthroughs and features that combine to make it the unique instrument that it is. The following list highlights the major features that you should be aware of.

- New, custom-design hexaphonic pickup is built into the bridge itself. Optimum pickup placement is assured, minimizing false notes and missed notes, even on the low strings.

- Programmable accurate string-bend response is provided with newly updated software. "Chromatic" response is also available when desired.

- The exclusive Ibanez Control Arm puts programmable synth control in the familiar "whammy bar" format. The strings themselves stay in pitch while you control any assignable synth parameter with the arm.

- Extensive synth control is available on the guitar itself, including Sensitivity, Velocity (pick response), and Volume control of up to two separate synths.

- The computer-assisted design of the maple body minimizes "hot spots" and "dead spots", and maximizes sustain and playing comfort.

- The exclusive-design GFRP reinforced maple neck keeps the playing response even throughout the entire range of the guitar — without the use of a stabilizing bar! The ebony fretboard further improves playability and response.

- The "headless" string lock system minimizes string-stretch and tuning problems throughout the life of the strings.

- The new, large-mass bridge/tailpiece assembly maintains a low-friction, straight-line string pulls for playability without tuning problems. The high-torque tuners provide easy, instant string tuning. Intonation adjustments are simple with the new design bridge saddles.

- The guitar itself includes the exclusive Ibanez pickups and famous Ibanez playability, so you will always have a great instrument at your command — whether you play it as a guitar or a synth!

- The MC1 Controller provides 128 programmable patches that are instantly recallable with any MIDI control signal or the remote Ibanez IFC60 Footswitch Controller.

- Extensive software to keep your MIDI Guitar System in calibration — quickly and easily.

- On-board guitar tuning system.

- Auto-hold "sustain-pedal" features to hold any note indefinately.
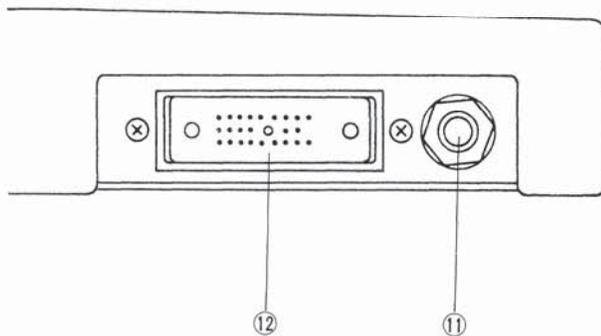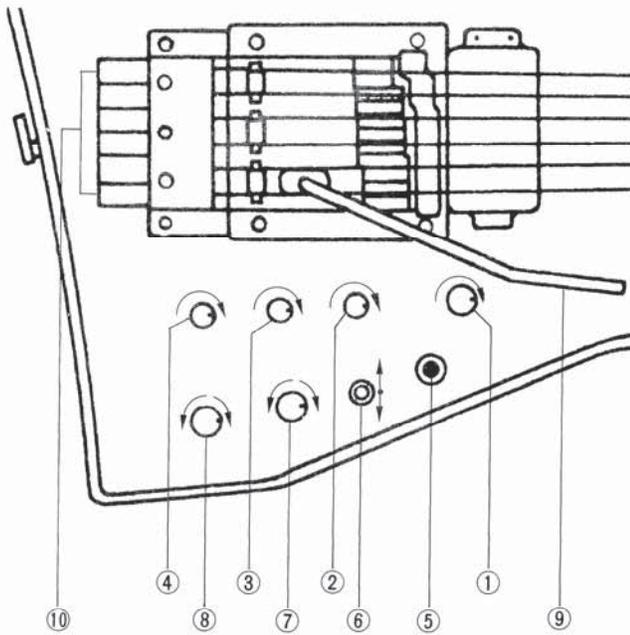
① MASTER VOLUME CONTROL

This knob controls the overall volume of both the synth and straight guitar sounds.

② SENSITIVITY

Controls the amount of pick attack necessary to trigger the MIDI guitar. Adjust to suit your playing technique.

③ VELOCITY

Turns string attack information into dynamic information for "touch sensitivity" control of your synth.

④ ASSIGNABLE CONTROL KNOB (CTL. CHANGE)

Allows the player to control the function assigned to it through the controller. Pitch bend, portamento or other effects can be assigned depending on the synthesizer used.

⑤ PICKUP SELECTOR

Selects neck pickup, bridge pickup or both pickups for regular guitar sound.

⑥ MODE SELECTION SWITCH

Select one of three modes:

Mode 1 — Synth only
Mode 2 — Synth and guitar
Mode 3 — Guitar only

⑦ TONE CONTROL

Controls tone of regular guitar sound.

⑧ BLEND CONTROL (BALANCER)

This controls the mix of regular guitar and synth signal.

⑨ ASSIGNABLE CONTROL ARM

Used in the conventional manner, this electronic control arm can be assigned pitch bend, glissando, portamento or other pitch controlled effects. Electronic rather than mechanical design eliminates the tuning problems of conventional tremolo units.

⑩ TUNING KNOBS

Smooth, accurate right-hand tuning is possible with this specially designed tuning system.

⑪ REGULAR GUITAR OUT

This is the straight guitar output.

⑫ GUITAR OUT

This multi-pin connector connects to the MC1 MIDI Controller.

b. MC1 MIDI Controller
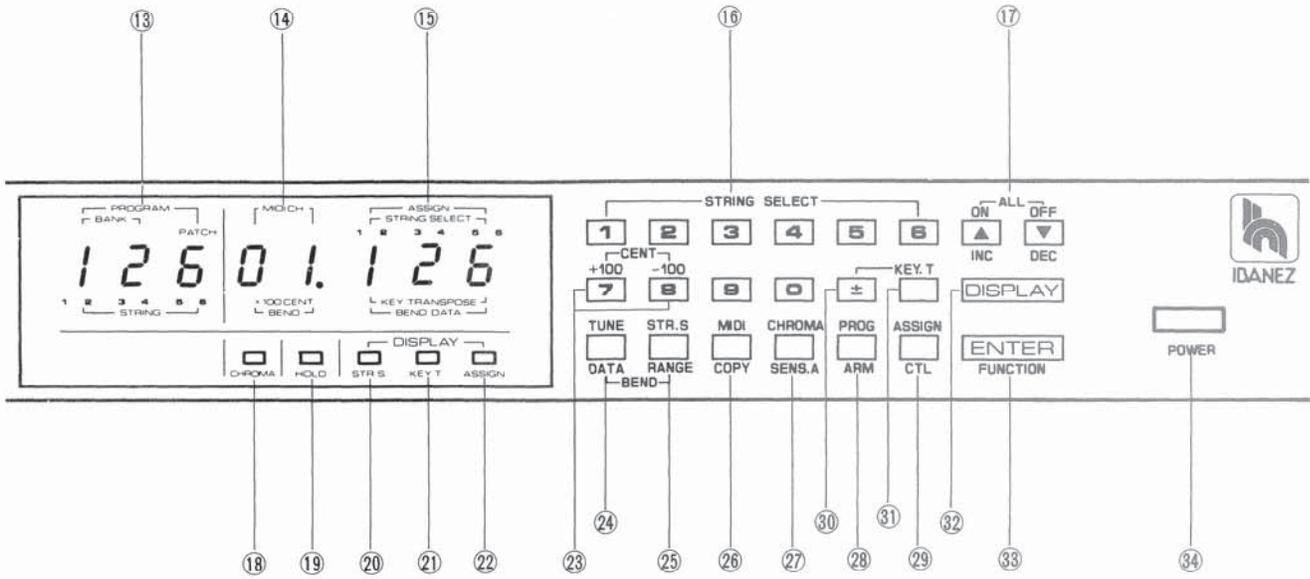
FRONT PANEL

⑬ PROGRAM DISPLAY

This LED readout displays the two digit BANK number and the one digit PATCH number. While playing, this display identifies the strings being played.

⑭ MIDI CHANNEL DISPLAY

This LED readout displays the selected MIDI channel number. This also displays the amount of string bend (measured in cents) while programming the BEND RANGE.

⑮ STRING ASSIGN DISPLAY

This LED readout displays the assigned patch number for the selected program. It also identifies the individual string modes, ON or OFF.

⑯ DATA ENTRY KEYS

(0—9) ... These keys are used in all data entry operations.
(1—6) ... These keys are also used in the STRING SELECT mode.

⑰ INCREMENT/DECREMENT KEYS

In the Play Mode, these keys are used to move the program numbers up (INC) or down (DEC). They are also used in other data entry and program functions as described in section 7b.

⑱ CHROMATIC INDICATOR

This LED will light when the MC1 is in chromatic operation.

⑲ HOLD INDICATOR

This LED will light when the hold function is engaged. The Hold function operates as a sustain pedal operates in a keyboard, allowing the notes to ring.

⑳ STR.S INDICATOR

This LED will light when the STRING SELECT information is being edited or reviewed.

㉑ KEY TRANSPOSE INDICATOR

This LED will light when the KEY TRANSPOSE information is being edited or reviewed.

㉒ ASSIGN INDICATOR

This LED will light when the ASSIGNED information is being edited or reviewed.

㉓ CENT KEY (+, – 100)

These keys are used to move the BEND DATA information up or down 100 cents at a time.

㉔ TUNE/BEND DATA KEY

The TUNE key engages the Tuning function. With this function, the IMG2010 guitar can be tuned to any pitch standard from A440 to A445. The BEND DATA key calls up the tuning function that allows calibration of the controller to the synth as described in section 7b.

㉕ STR.S (STRING SELECT)/BEND RANGE KEY

The STRING SELECT key is used to turn strings 1—6 on or off. The BEND RANGE key allows the user to control the range of the string bend.

㉖ MIDI ASSIGN/COPY KEY

This key is used to assign MIDI channels 1—16 to each program location.
The COPY function allows the user to copy a program into another location without changing the program contents.

㉗ CHROMA. (CHROMATIC BEND)/SENS. A KEY

This key selects chromatic or string bend operation. SENS.A will display the bar graph used to calibrate the sensitivity.

㉘ PROGRAM SELECT/ARM KEY

This key is used for the assignment or recall of a program number. The ARM key is used to assign the ⑨ Assignable Control Arm one of the many available functions. NOTE: The available functions are determined by the device being controlled.

㉙ ASSIGN/CTL KEY

The ASSIGN key is used to assign a patch to a specific program. CTL is used to assign a function to the ④ ASSIGNABLE CONTROL KNOB.

㉚ +, – KEY

This key is used to set the transpose direction of the synth.

㉛ KEY TRANSPOSE KEY

This key allows the user to adjust the pitch of the synth voice up or down by up to one octave.

③② DISPLAY KEY

The DISPLAY key selects the function to be edited, displayed or assigned. It is also used to change the string display when assigning each string to specific MIDI channels.

③③ ENTER KEY

This key is used to enter data into memory. It is also used to access the lower (blue) functions.

③④ POWER

Depressing this switch turns the power on.
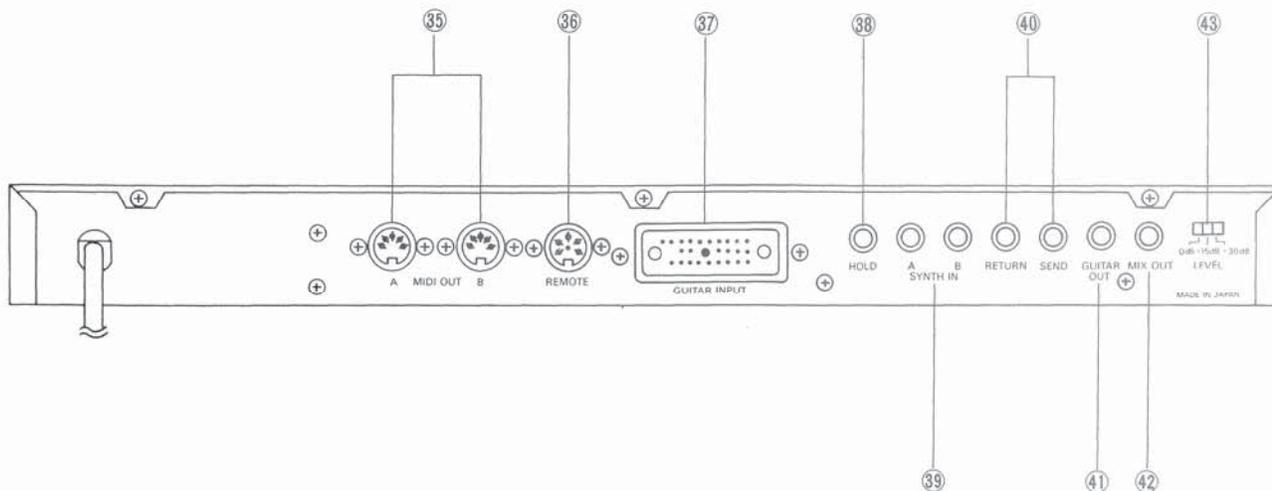
REAR PANEL

③⑤ MIDI OUT A·B

MIDI OUT A is connected to the MIDI IN on synthesizer 1 and MIDI OUT B is connected to the MIDI IN on synthesizer 2. MIDI OUT A and MIDI OUT B send identical MIDI information.

③⑥ REMOTE JACK

The REMOTE is connected to the optional IFC60 INTELLIGENT FOOT CONTROLLER for remote control of program location selection.

③⑦ GUITAR INPUT

This input accepts the input from the IMG2010 guitar.

③⑧ HOLD

This is the input for the remote control of the HOLD function. Use a momentary-type footswitch, such as the Ibanez FS1M.

③⑨ SYNTH IN A·B

These are the audio inputs that accept the outputs of the synths; SYNTH IN A from Synthesizer 1 and SYNTH IN B from Synthesizer 2.

④⓪ SEND, RETURN

This is the input and output for the built in effects loop. The SEND is the output to the effect and the RETURN is the input from the output of the effect. The loop is placed in the guitar signal line prior to mixing with the synth voice.

④① GUITAR OUT

This is the straight guitar output.

④② MIX OUT

This is the mixed signal output (synthesizer and guitar). When ④① GUITAR OUT is used, this output is synthesizer only.

④③ LEVEL

This is the output attenuation control: 0dB, −15dB or −30dB. It adjusts the output level of the MC1 to the optimum level for your playback system input.

The Ibanez MIDI Guitar System is quite easy to hook up, as can be seen in the diagram. The MC1 MIDI Controller serves as the central control and connection unit for the system. Whether your MIDI system is relatively simple or complex, it should always be hooked up in this fashion.

The IMG2010 MIDI Guitar connects to the MC1 via a multi-pin connector cable (provided). This connection will handle all signal and control information from the guitar. Note that the guitar also includes a standard 1/4" guitar jack. This is for using the IMG2010 as a standard guitar. The use of this jack is optional.

There are two basic connections between the MC1 and the synths you with to control. The first is the MIDI control signal from the MC1 to the synths' MIDI IN port. The MIDI connections in your system may vary with the number and type of synths you use. For more information about MIDI connections, refer to section 6 of this manual: "About MIDI".

The second connection is the audio signal return from the synth(s) to the MC1. This allows the system to control the "mix" of guitar and synth signals from a control on the guitar. If this "mix" control is not necessary for your application, you may run your synth outputs directly to your playback system or amplifier.

The MC1 will accept audio input from two different synths, putting these signals under programmable control. If more than two synths are to be used, their audio outputs will have to be externally mixed together before returning to the MC1.

The effects loop enables you to modify the guitar signal with any effect(s) you wish. The loop occurs before the mix with the synth signal(s). The MIDI signal from the MC1 may also be used to control your effects rack, if your rack accepts MIDI control.

The final connections hook up the MC1 to your playback system or amplifier. The guitar and synth signals may be kept separate, if desired. By using the Guitar Output for the guitar signal, the Mix Output becomes a "Synth Only" output. Even though the signals are now separated, they are still under the programmed control of the MC1.

Finally, a few words regarding the power connections. Since most MIDI systems use more than one unit that is AC powered, it becomes necessary to think about system grounding. Ideally, all units (both internal circuits and external chassis) should be grounded, preferably at a single point. One way to do this is to use a chosen unit (one with a grounded power cord) as the main grounding unit, and connect all other grounds to the main unit. This may require that you "lift" the ground connection on other units. Refer to the various owners manuals to see if the audio connection makes a ground connection as well. If not, a separate chassis ground connection must be made. Once the grounds are connected in this way, ground loops are eliminated and system hum and noise is minimized.

MIDI Keyboard A

MIDI IN

OUTPUT

MIDI Keyboard B

MIDI IN

OUTPUT

OUTPUT

MIDI Guitar
IMG2010

Digital Multi Effects DUE400

OUTPUT   INPUT

MIDI Controller
MC1

Intelligent Foot Controller IFC60

Footswtich
FSIM

INPUT

INPUT

Guitar Amp

P.A. Amp
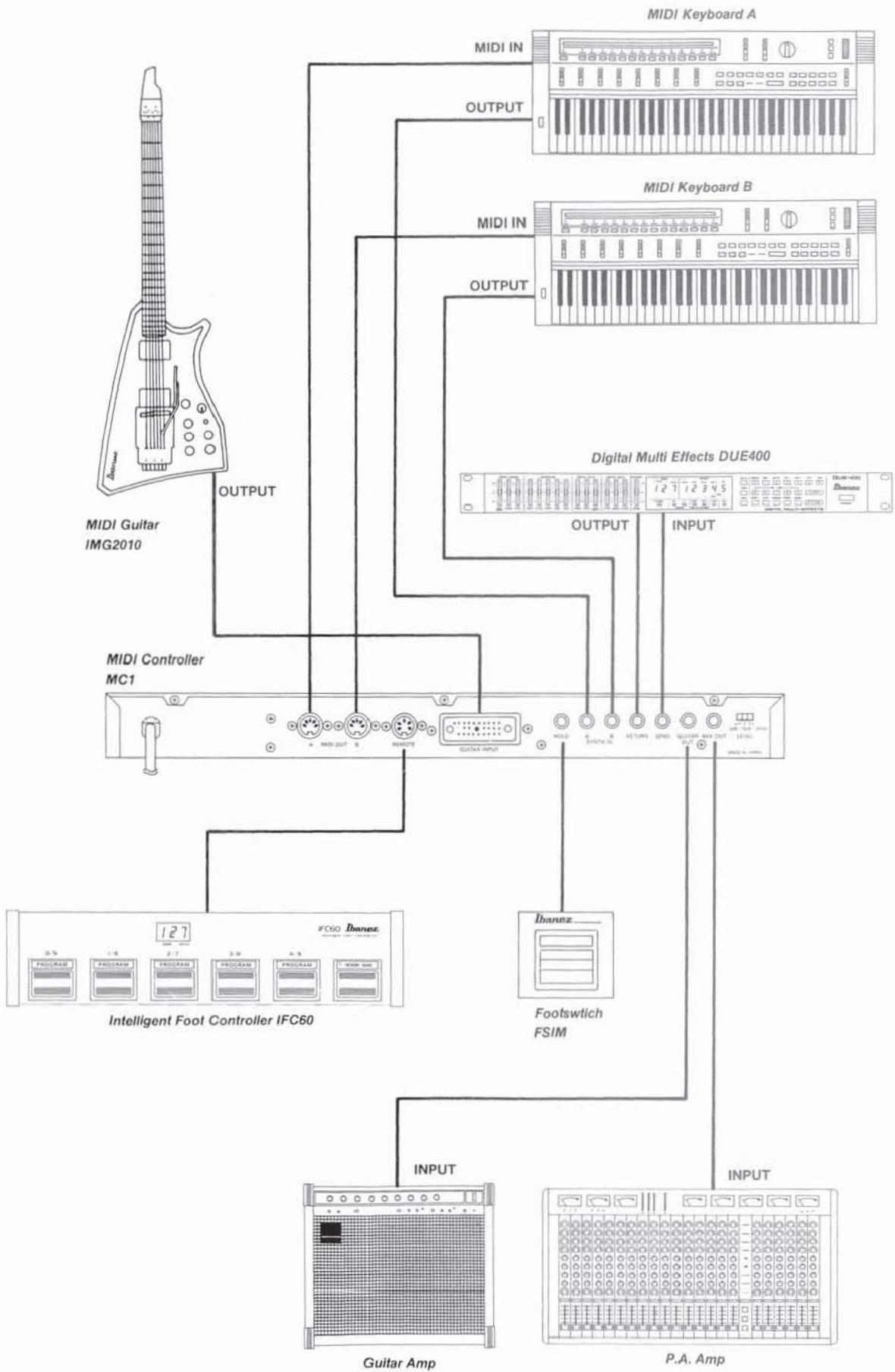
a. Guitar Setup

To achieve the best performance with the Ibanez MIDI guitar system, it is important that the 2010 MIDI guitar be properly set up. The following simple steps will help you get the most from your system.

1) RESTRING THE GUITAR

Loosen the string by turning the turning knob counter-clockwise. Remove string from locking clamp by loosening the locking screw. Insert ballend of new string into ballend holder at the bridge. Feed string through hole in locking clamp and retighten screw. Tune to pitch using tuning knob.
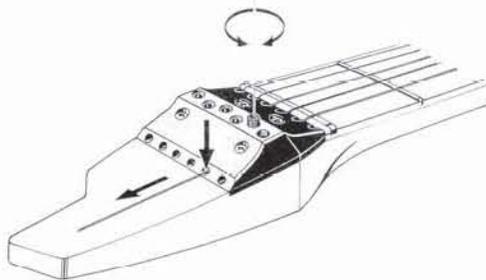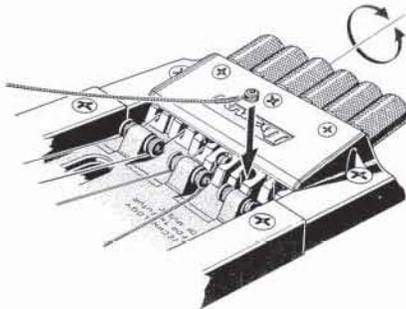
2) STRING ACTION

Each string can be raised or lowered independently. To adjust height, loosen locking screws located on the side of the bridge. Adjust the height of each string using the two height adjusting screws on each string saddle. After string action has been set, lock the bridge pieces by means of the locking screws on the side of the bridge.

3) INTONATION

For the MIDI guitar to track properly, it is very important that the intonation be correct. Loosen locking screws located on the side of the bridge. Play the twelfth fret harmonic. Play the fretted note at the twelfth fret. If the fretted note is sharp when compared to the harmonic, the string saddle must be moved back towards the tuning knobs. If the fretted note is lower in pitch than the harmonic, the string saddle should be moved forward towards the fingerboard. To move the string saddle, loosen the string then adjust the saddle by pushing it forward or backward. An electronic guitar tuner such as the Ibanez DAT-6 should be used to assure accurate intonation. After all adjustments have been made, retighten locking screws on side of bridge. If you are not confident about making the adjustments yourself, refer the guitar to a qualified guitar technician.
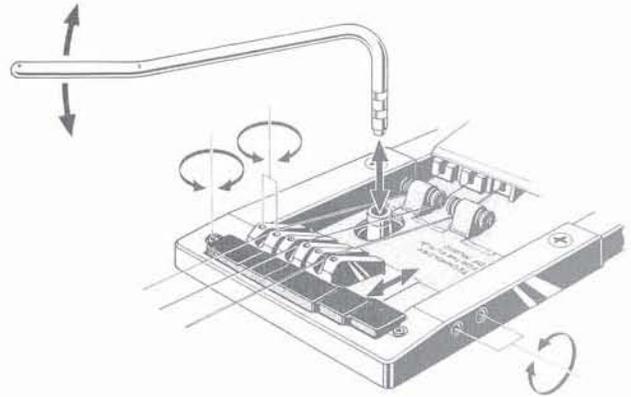
4) PICKUP HEIGHT ADJUSTMENT

The standard humbucking pickups are set up in the same manner as any regular guitar pickup. As long as the pickup is adjusted to be parallel to the strings, height can be set to suit your individual preference by means of three height adjustment screws, two on the bass side of the pickup and one on the treble side. The MIDI hex pickup is adjustable for height by means of two screws, one on each end of the pickup.

0.5mm   6TH STRING   0.8mm

HEX PICKUP
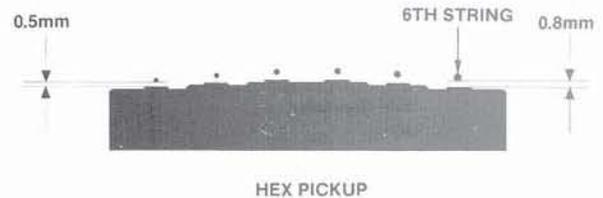
b. System Calibration

Procedures for system calibration are as follows:

1) TUNING THE IMG2010 GUITAR

To engage the Tuning Function, first depress ㉔ TUNE KEY. As a result of this, a flashing "440" will appear on the ⑬ PROGRAM DISPLAY. If you wish to change the pitch standard, depress the ⑰ INCREMENT KEY and the number will increase by one. The pitch standard can be changed A440 — A445 with this procedure.

While in the tune mode, a small upside down "U" will appear in the ⑮ STRING ASSIGN DISPLAY. When a single string is picked, the string number will appear in the ⑬ PROGRAM DISPLAY and will remain there as long as the note is sustained. If the string is not in tune, the upside down "U" will be broken and one of the lower legs will be to the right or left of the figure. If this leg is to the right (sharp), turn the ⑩ TUNING KNOB for that string counter-clockwise until the lower leg aligns with the upper leg to complete the upside down "U".

If this leg is to the left (flat), turn the ⑩ TUNING KNOB for that string clockwise until the lower leg aligns with the upper leg to complete the upside down "U".

Repeat this procedure for all six strings and the MC1 and IMG2010 will be in tune.

Once the tuning function is complete, depress the �33 ENTER KEY to continue playing, editting or further calibration.

2) SENSITIVITY CALIBRATION

To calibrate the sensitivity for optimum tracking and playability, first tune the guitar as described in the previous procedure. Then engage the sensitivity function by depressing ㉝ ENTER KEY and holding it down. While holding the ENTER KEY, depress ㉗ CHROMATIC KEY and the SENS.A (SENSITIVITY) function will be accessed.

When in the Sensitivity Calibration mode, the letters "SA" will appear on the ⑬ PROGRAM DISPLAY. When a string is picked, two LED bar graphs will appear on the ⑮ STRING ASSIGN DISPLAY that will move across the display from left to right. If the system is properly calibrated, as it should be from the factory, the upper bar graph will reach the 5 or 6 mark of the string select guide and will remain there as long as the string is sustained. The lower bar graph should also reach the 5 or 6 mark but return to 3 or 4 in approximately 1 second. The lower bar graph will remain at the 3 or 4 mark briefly before disappearing.

The sensitivity should only need to be calibrated when the strings have been changed or other work has been done on the guitar. If the sensitivity must be calibrated, first check the height of the HEX Pickup. To check the height of the HEX pickup, fret the first string on the 22nd fret and measure the height from the bottom of the string to the top of the pickup. The distance should be 0.5mm. If the distance is incorrect, turn the screw closest to the first string to adjust the pickup up or down. The procedure is the same for the sixth string with one difference, the distance from the bottom of the string to the top of the pickup should be 0.8mm. If the distance is incorrect, turn the screw closest to the sixth string to adjust the distance.

The next step is to check the sensitivity of each string as described previously. If the sensitivity is off, remove the rubber plug covering the sensitivity trim pots in the back of the guitar. The trim pots are numbered 1 through 6, corresponding to the 1st through 6th strings (1st being the highest the 6th being the lowest). Pick a string. If the bar graph indicates too much sensitivity, take a small, flat head screwdriver and CAREFULLY turn the adjustment pot counter-clockwise until the string is within specification. If the bar graph indicates a loss of sensitivity, again take a small flat head screwdriver and CAREFULLY turn the adjustment pot clockwise until the string is within specification. Adjust all the strings with this procedure. When calibration is completed, replace the rubber plug and return the MC1 to play rnode.

RUBBER COVER

TRIM POTS

MAX

1 2 3 4 5 6
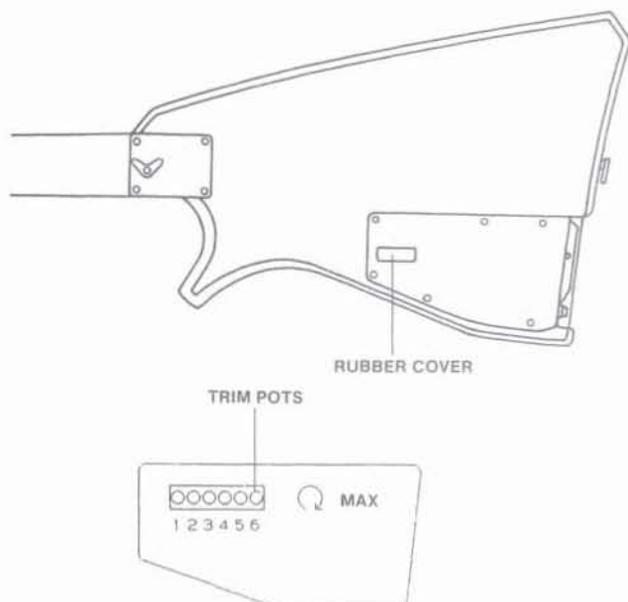
While it is not necessary that you understand everything about the MIDI standard, it is helpful to be familiar with some of the main points. The following discussion will cover these main points, so that you can easily implement all of the features built into the Ibanez MIDI Guitar System.

The MIDI (Musicl Instrument Digital Interface) standard is a multi-manufacturer information exchnge code that lets any-one control a number of "slave" instruments from a "master" instrument or control source. Playing a note on the master will, for example, cause the slave(s) to follow suit. Patches can be changed, synths can be synchronized in song, just about any musical event can be described in MIDI. Once in MIDI form, the musical event becomes a command from the master to the slave(s).

MIDI is a "serial" interface, meaning that all inforamtion is transmitted over a single wire. Control information is trans-mitted from the MIDI OUT port of the master unit, and the slave(s) receive the information through the MIDI IN port. The MIDI THRU ports on slave units can be quite useful. These ports simply "repeat" the information received at the unit's MIDI IN port, allowing other slave units to receive the same control signal. Keep in mind that the MIDI OUT ports on slave units are inactive unless the slave unit operates as a master unit at some point.

The MIDI code provides up to 16 separate channels to be transmitted over the single, serial line (channels 1 through 16). This permits certain inforamtion to be transmitted over specific channels, to be received by slave units "tuned" to the specific channels. This multi-channel format enables MIDI to accomodate monophonic as well as polyphonic synthesizers.

MIDI provides four basic modes of information transfer. Both the master and slave(s) units must be set to the same mode for accurate inforamtion transfer.

● MODE 1 — Omni On/Poly

Here, MIDI information may be transmitted and received over any channel (the "omni on" part) and each channel can accomodate more than one note at a time (the "poly" part). Essentially, MIDI transmission is reduced to single channel, polyphonic operation. For any MIDI synths, this is the "default" mode — that is, when the unit is turned on and not preassigned to another mode, this mode is chosen auto-matically.

● MODE 2 — Omni On/Mono

Again, information is transferred over all channels, but only one note is played at a time (the "mono" part). This mode is used for lead-line type sounds, where polyphonic textures are not required.

● MODE 3 — Omni Off/Poly

In this mode MIDI inforamtion is transmitted over specifically assigned MIDI channels, and each slave is assigned to "listen" to a specific channel (the "omni off" part). Each channel's information is polyphonic, so that each slave can receive its own, polyphonic information from a single MIDI line.

● MODE 4 — Omni Off/Mono

Again, MIDI information is transmitted over specifically assigned MIDI channels, but channel information is now monophonic (one note at a time per channel). The slave units can still play polyphonically, by receiving more than one channel (for example, one channel per voice). In this mode each voice of a slave unit may be independently controlled. For example, each voice can have totally different sounds. Or one voice may be "bent" (as when a guitar string is bent), while the other voices (strings) remain at pitch.

It should be noted here that the MC1 MIDI Controller selects its transmission mode automatically, depending on the features that are called up. As a player, you should be aware of which modes are used by the MC1, and whether the particular synth(s) you wish to use can receive these modes. The mode information of the MC1 is included in the next section of this manual.

This section describes the procedures for programming information into the MC1 MIDI Controller, and for interfacing the MC1 with synthesizers. If you already have your information in your MC1 and you have correctly hooked up the MC1 to you synth(s), you may proceed to section 8 of this manual: "Playing The Ibanez MIDI Guitar System".

a. Interfacing The MC1 With MIDI Synthesizers

Interfacing the MC1 with MIDI synthesizers involves a little more than just making the audio and MIDI connections between the units. For each synth you wish to use, you must refer to the synth owner's manual for such vital statistics as:

● Is the synth monophonic or polyphonics?
● How many voices does the synth provide?
● Are the voices individually assignable to different MIDI channels?
● What are the synth's assignable MIDI channels? Some lower cost units only transmit and receive on channel 1, for example.
● What are the possible MIDI transmit/receive modes?
● What are the MIDI controllable control functions (such as key velocity, portimento, pitch bend, breath control, etc.)?
● What are the MIDI assignment numbers for these functions?
● How many pre-set patches (sound voicings) does the unit offer?
● What are the MIDI assignment numbers for the pre-set patches?
● Any other pertinent MIDI information regarding the playing and control of the synth.

When you program your sounds into the MC1's memory, you have various options to choose from. Keeping the above information handy while programming the MC1 will help you make the best choices, and tell you if certain options are possible with the synth(s) you wish to use. For example, if you wish to control the modulation of a patch from an assignable control on the MIDI guitar, you must know if your synth puts the modulation function under MIDI control. If it is MIDI controllable, you have to know the MIDI assignment number for that function.

It's really not as hard as it sounds. Just keep the synth owner's manual open to the page on MIDI, and go headlong into the next section. It will indicate what information you need, and when. Now, let's create some sounds!

b. Building A Program

The following section describes the sequence of events that occurs when a program is constructed from "scratch". Along the way, you will make decisions based on the sound you wish to create, and on the MIDI capabilities of the synth(s) you are using. If certain portions of the procedure do not pertain to the program you are constructing, just move on to the next part.

1) **Setting the program number**
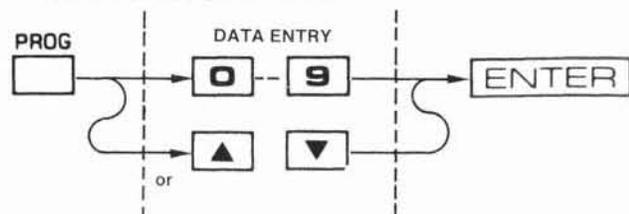
This procedure sets the program location of the MC1 that you will be programming. The program loction is a "workspace" within the MC1 where sounds are created. The MC1 provides 128 program locations, from 000 to 127.

As shown in the flow chart above, start by pressing ㉘ PROGRAM SELECT KEY. The 3 digits of ⑬ PROGRAM DISPLAY will begin to blink, indicating that a program location number needs to be entered. Enter the desired location number by using either ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS. As the location is entered, note that the digits keep blinking. Once the desired location is entered, press ㉝ ENTER. This enters the selection into memory. The digits stop blinking.

2) **Assigning the synth "patch"**
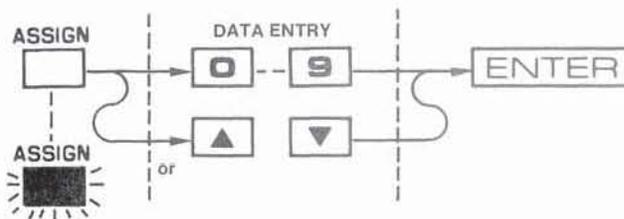
This procedure assigns the particular synthesizer sound (patch) to the selected program location. Each type of synth will have a different number of preset sounds that may be assigned. Refer to your synth owner's manual for a listing of the patches and their MIDI assignment numbers.

Start by pressing ㉙ ASSIGN KEY. This will cause ㉒ ASSIGN INDICATOR and the 3 digits of ⑬ STRING ASSIGN DISPLAY to blink, indicating that a patch selection number needs to be entered. Enter the MIDI assignment number of the desired patch (from your synth manual). The digits will keep blinking. Once the desired patch number is entered, press ㉝ ENTER. This will enter the patch selection into memory — this patch will be assigned to this program location until you decide to "edit" the progam location at a later time. The ㉒ ASSIGN INDICATOR and ⑮ STRING ASSIGN DISPLAY will stop blinking.

Note: The MC1 provides up to 128 different patch assignments, starting from 000. However, many synths start numbering their patches at 001. If this is the case with your synth, SUBTRACT 1 from the patch number before entering it into the MC1. You will have to do this every time you assign a patch from that synth into the MC1.

3) **Assigning the ④ ASSIGNABLE CONTROL KNOB**
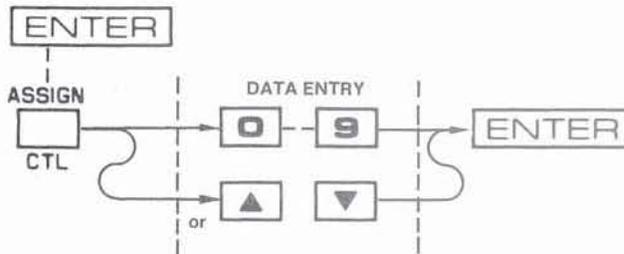
● First press ㉝ ENTER and hold while pressing ㉙ ASSIGN KEY, then release both.

To start this procedure press ㉝ ENTER and ㉙ ASSIGN KEY as described above. This will cause the two digits of ⑭ MIDI CHANNEL DISPLAY to blink, indicating that a MIDI control number needs to be entered. Using ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS, enter the desired MIDI

control number from the listing in the synth manual. The two digits will keep on blinking. When the desired number is entered, press ㉝ ENTER. This puts the selected number into memory, and causes the two digits to stop blinking.

Note: The present MIDI standard provides up to ㉜ MIDI control numbers (from 00 to 31). If, during this procedure, you enter in a number higher than 31, an "error" message will appear on the display of the MC1. When this happens, just enter in the desired number again and continue with the procedure.

Once the knob assignment has been made, you may wish to change the range of control the knob has. This is done by changing the control range on the synth. Refer to your synth owner's manual.

4) Assigning ⑨ ASSIGNABLE CONTROL ARM
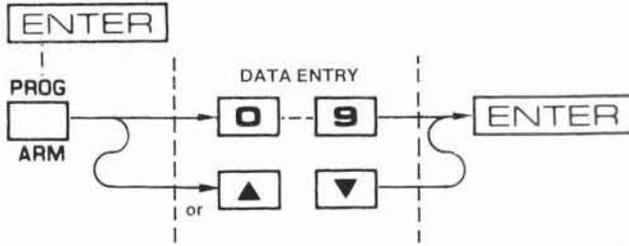
● First press ㉝ ENTER and hold while pressing ㉘ PROGRAM SELECT KEY, then release both.

The ⑨ ASSIGNABLE CONTROL ARM is similar to ④ ASSIGNABLE CONTROL KNOB, in that any MIDI controllable parameter of the synth may be assigned to arm control. Again, refer to the owner's manual of your synth for the listing of patch parameters under MIDI control, and their MIDI control numbers.

Start by pressing ㉝ ENTER and ㉘ PROGRAM SELECT KEY as described in the flow chart. The two digits of ⑭ MIDI CHANNEL DISPLAY will blink, indicating that a MIDI control number needs to be entered. Using ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS, enter in the desired MIDI control number (from the listing in your synth manual). The two digits will continue blinking. When the desired number is entered, press ㉝ ENTER. This puts the number into memory, and causes the two digits to stop blinking.

Note: The MIDI standard provides 32 MIDI control numbers, from 00 to 31. If, during this procedure, a number higher than 31 is entered, the display will read "Pb", indicating that the pitch bend function has been assigned to arm control. If this is not desired, simply enter in the desired MIDI control number and continue with the procedure.

Once the arm assignment has been made, you may wish to change the range of control that the arm has. This is done by changing the control range on your synth. Refer to your synth owner's manual.

5) Setting the synth voice transposition
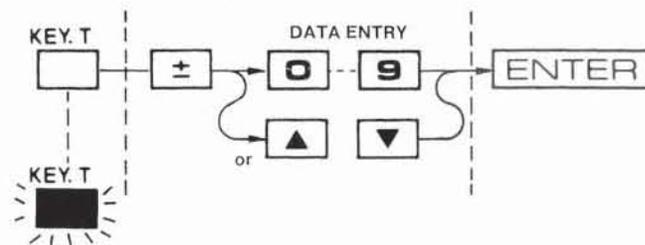
This procedure sets the synth voice transposition, or the amount of shift in the pitch of the synth's voice with respect to the guitar. The amount of shift is adjustable in "semitones", or "half steps" from 12 half steps (one octave up) to −12 half steps (one octave down).

Start by pressing ㉛ KEY TRANSPOSE KEY. This causes ㉑ KEY TRANSPOSE INDICATOR and two digits of ⑮ STRING ASSIGN DISPLAY to blink, indicating that transposition information needs to be entered. If it is desired to transpose down, press ㉚ +, − KEY. The display will indicate this with a "negative sign" in front of the number. If the negative sign is present and you wish to transpose up, press ㉚ +, − KEY again. This removes the negative sign. Then enter the number of half steps of shift desired with eitehr ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS. The two digits will keep blinking. When the desired shift is entered press ㉝ ENTER. This enters the shift information into memory and causes the ⑮ STRING ASSIGN DISPLAY and ㉑ KEY TRANSPOSE INDICATOR to stop blinking.

6) Activating selected strings
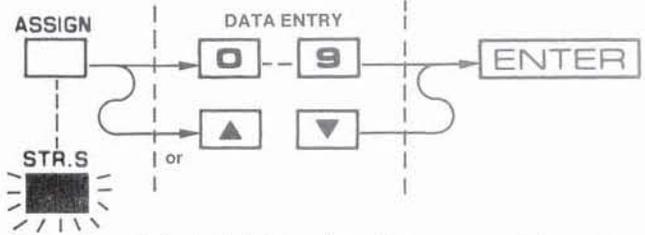
Sometimes it is desirable to de-activate some of the guitar strings, so that only selected strings create synth sound. For example, you may wish to add a bass synth patch to the two lowest strings. Or you may add a "strings" patch to the three highest strings for chord work.

Start by pressing ㉕ STRING SELECT KEY. This causes ⑳ STRING SELECT INDICATOR and six vertical lines in ⑮ STRING ASSIGN DISPLAY to blink. The six lines represent each string of the guitar. Select the desired strings by using keys "1" through "6" of ⑯ DATA ENTRY KEYS, or turn all strings on or off by using ⑰ INCREMENT/DECREMENT KEYS. Notice that as strings are deactivated, the vertical line representing that string is cut in half. As a string is activated, the line returns to full length. During this time the display continues to blink. Once the desired strings are activated press ㉝ ENTER. This puts the string assignment into memory and causes the display to stop blinking.

7) Assigning MC1 MIDI channel
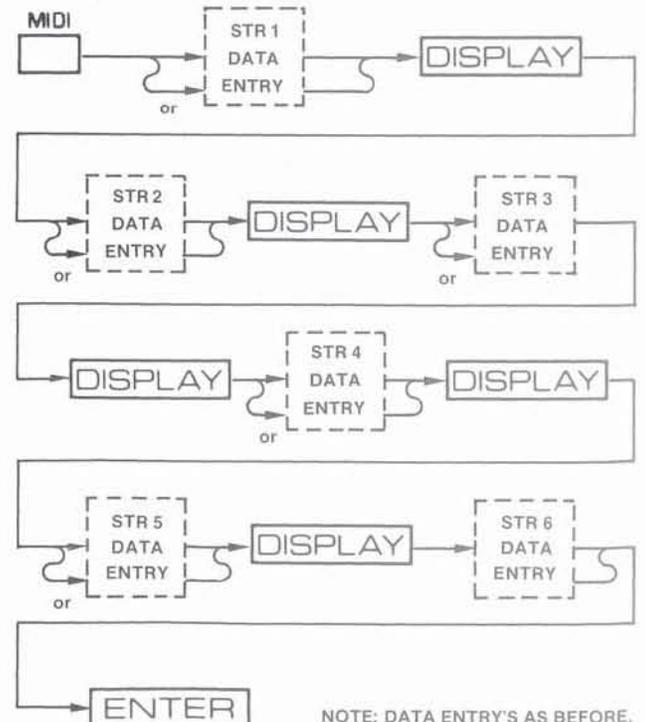
NOTE: DATA ENTRY'S AS BEFORE.

This procedure assigns the MIDI channel (or channels) that the MC1 transmits over. First refer to the synth owner's manual to find out (a) how many MIDI channels the synth can receive, (b) if the synth's MIDI channel(s) are assignable, (c) and the MIDI transmit/receive modes the synth can be assigned to. Then you must decide how many MIDI channels you need. If, for example, your synth can receive six different MIDI channels at once (One channel per synth voice), then you may use up to six channels to talk to the synth. This would happen using the "Omni off/Mono" Mode (Mode 4) which would allow you to bend all strings independently. If you play only one note at a time while string-bending, then you would need only one MIDI channel, and would operate in the "Omni off/Poly" Mode (Mode 3).

Start by pressing ㉖ MIDI ASSIGN KEY. This causes ⑬ PROGRAM DISPLAY to indicate string "1" and causes the two digits of ⑭ MIDI CHANNEL DISPLAY to blink. All this indicates that string "1" is about to receive a MIDI channel assignment. Enter the desired MIDI channel using ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS. When the desired channel is entered press ㉜ DISPLAY KEY to advance to the next string. Continue the cycle of data entry and pressing ㉜ DISPLAY KEY until all six strings have been assigned to the desired MIDI channel(s). Then press ㉝ ENTER. The MIDI channel information is placed into memory, and the ⑭ MIDI CHANNEL DISPLAY stops blinking.

Finally, you need to assign your synth to the same MIDI channel(s) that you assigned the strings to. Also, set the synth for either Mode 3 (Omni off/Poly) or Mode 4 (Omni off/Mono) as discussed above.

Note: The MIDI channel assignment procedure selects the string assignments for all program locations of the MC1. So you only have to perform this procedure once.

8) Selecting chromatic/non-chromatic operation
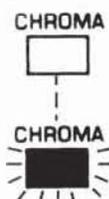
This procedure selects between chromatic and non-chromatic operation of the MC1. With chromatic operation the notes of the synth will always be one of the chromatic notes of the scale. If the MIDI guitar is playing a note that is not an exact chromatic note (during string bending, for example) the MC1 will instruct the synth to play the nearest chromatic note. In chromatic operation the MC1 transmits in Mode 3 (Omni off/Poly), except when each string is assigned to a different MIDI channel. Then the MC1 transmits in Mode 4 (Omni off/Mono).

With non-chromatic operation the synth will be able to play notes between the chromatic notes. This mode of operation is chosen when it is desired to play non-chromatic notes, such as when a string is bent. In non-chromatic operation the MC1 transmits in Mode 4 when one note is played and automatically switches to Mode 3 chromatic operation when more than one note is played. However, when each string is assigned to a different MIDI channel, the MC1 stays in Mode 4.

This procedure simply uses ㉗ CHROMATIC KEY. Repeated pressing of this key alternately takes the MC1 in and out of chromatic operation. The ⑱ CHROMATIC INDICATOR lights when the unit is in chromatic operation.

If you have selected chromatic operation you are finally

finished programming your program location. If you have selected non-chromatic operation you must proceed to the next step to calibrate the synth's non-chromatic operation to that of the guitar. In other words, you must match the "bend" of the synth note to the bend of the guitar string.

9) Setting the synth's "string bend" action

a) "Bend Range" setting:
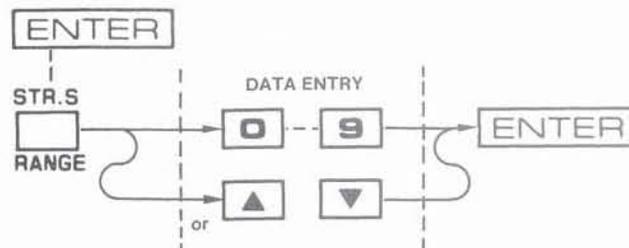
● First press ㉝ ENTER and hold while pressing ㉕ STRING SELECT KEY, then release both.

This procedure sets the maximum amount of pitch bend that you intend to use. To determine how much pitch bend you will use, bend a string the maximum amount you would bend a string during normal playing. Determine how many half-steps (frets) of bend that is, then add one half-step. For example, if you bend a maximum of one whole-step (two half-steps), your maximum amount of bend to set would be three half-steps. Once you have that, you may start the procedure.

Start by pressing ㉝ ENTER and ㉕ STRING SELECT KEY as described in the flow chart. This causes the two digits of ⑭ MIDI CHANNEL DISPLAY to blink, indicating that the maximum amount of pitch bend needs to be entered. Enter the amount using ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECREMENT KEYS. Once the maximum amount has been entered press ㉝ ENTER. This puts the amount into memory and causes the two digits to stop blinking.

b) "Bend Data" setting
[Before beginning this procedure be sure to complete the previous procedure! "Bend Range" setting.]
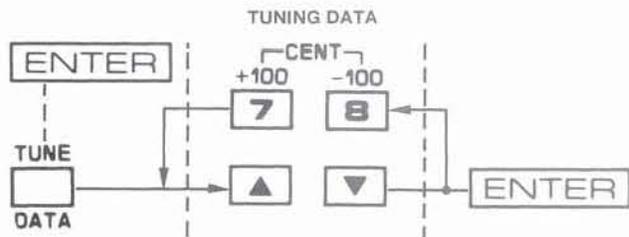
● First press ㉝ ENTER and hold while pressing ㉔ TUNE KEY, then release both.

This procedure calibrates the MC1's MIDI bend command to the actual amount of pitch bend by the synth. Before you begin this procedure, you have to set the "pitch wheel" range on the synth, and in doing so, you have to make a few decisions.

Typically, the "pitch wheel" range is set to the same range as the bend range set on the MC1. This provides the "smoothest" pitch bend possible. However, the "pitch wheel" range is also limited to the range set for string bending. This may not seem like much of a problem, but if, for example, the ⑨ ASSIGNABLE CONTROL ARM is assigned to control the "pitch wheel" function, then the pitch range of the control arm is limited to the range set for string bending.

The alternative is to set the pitch wheel range larger than the IMC1's bend range. Set this way, the ⑨ ASSIGNABLE

CONTROL ARM may operate over any range of pitch bend that you choose. Also, you may still set the MC1's bend range to the amount determined by the previous procedure (Bend Range Setting).

There are, however, two disadvantages with this alternative. First, the actual string bend will be less smooth than if the ranges on the synth and the MC1 where equal. Second, the "Bend Data Setting Chart" will not be usable since the chart provides the bend data for equal range set on the synth and MC1. You may still use the other two methods for setting the MC1's bend data (these are all described in the following porocedure).

With all that said, you may set the pitch wheel range on your synth. Most synths use "half-steps" (or semitones) to describe the pitch wheel range. This is what the MC1 uses, to matching pitch bend ranges is merely a matter of matching the amount of half-steps. However, if your synth uses another measure of pitch bend, you'll have to convert it over to half-steps before you match the synth's range to the MC1's range. Follow the procedure in your synth's manual to set the pitch wheel range on your synth.

We are now finally ready to enter "bend data" into the MC1. Start by pressing ㉝ ENTER and ㉔ TUNE KEY as described in the flow chart. This causes the ⑭ MIDI CHANNEL DISPLAY to read "01", which corresponds to one half-step. Also, the MC1 sends a command to the synth: "Play and hold an A-flat note that is being bend up by one half-step to an A-natural". This is the "reference tone" that is used throughout this procedure.
Finally, the ⑮ STRING ASSIGN DISPLAY reads the MC's "pitch increment", indicating how much pitch bend the MC1 is calling for.

We are ready to enter the bend data for the first half-step in the MC1's bend range (half-step "01"). This is simply done by "tuning" the reference tone to "A-natural". With the ⑰ INCREMENT/DECREMENT KEYS, you may tune the reference tone using one of three available methods:

* If the MC1 bend range and the synth's pitch wheel range are the same, and if your synth is listed in the "Bend Data Chart" (shown below), simply match the MC1's pitch increment with the number given in the chart. If you cannot use the chart, you may:

* Use a tuning device, such as a standard "guitar tuner" to tune the reference tone to "A-natural" (5th string). Or, you may:

* Match the reference tone "by ear" to the open A-string on the guitar. Make sure the guitar is in tune before attempting to tune the reference tone.

If the note dies away while you are tuning, just play an A-flat on the keyboard (since it is being "bent up" one half-step) when you need to hear the reference tone. Pressing the ⑰ INCREMENT/DECREMENT KEYS once will cause the pitch increment to go up or down by one increment. Pressing and holding these keys will cause the pitch increment to go up or down more rapidly.

When the reference tone has been tuned, you are ready to go on to the next interval of bend. Press ㉓ +100 CENT KEY. This will cause the MC1 to advance to the next interval and to send the command for the next reference tone. Again, the tone is bent up by the interval displayed by ⑭ MIDI CHANNEL DISPLAY to an A-natural. Use the same tuning procedure that you used before. Continue this tuning cycle for each half-step interval in the MC1's bend range. When all of the intervals of bend are tuned, press ㉝ ENTER. This puts all of the bend data into memory and turns off the reference tone.

Following is Bend Data, when you use each Synth as voice generator. (A = 440 Hz)

BRAND	MODEL	BEND RANGE	BEND DATA											
			100	200	300	400	500	600	700	800	900	1000	1100	1200
YAMAHA	DX-7,TX-7	3	360	680	992	—	—	—	—	—	—	—	—	—
		4	280	504	760	999	—	—	—	—	—	—	—	—
		5	216	408	616	822	999	—	—	—	—	—	—	—
		6	200	360	520	680	850	999	—	—	—	—	—	—
		7	168	312	440	584	728	864	992	—	—	—	—	—
		12	104	200	280	360	440	520	600	696	776	850	932	992
Roland	JX-3P	4 (mid)	270	530	782	986	—	—	—	—	—	—	—	—
	JUNO106	5	205	410	612	818	999	—	—	—	—	—	—	—
	MSK80	5	204	406	603	805	979	—	—	—	—	—	—	—
KORG	DW-8000	4	183	440	697	936	—	—	—	—	—	—	—	—
		5	151	359	551	759	949	—	—	—	—	—	—	—
CASIO	CZ-3000	4	269	521	781	998	—	—	—	—	—	—	—	—
		5	212	420	623	822	997	—	—	—	—	—	—	—
		6	181	354	543	709	713	999	—	—	—	—	—	—
ENSONIQ	MIRAGE	2	472	977	—	—	—	—	—	—	—	—	—	—
		3	328	680	992	—	—	—	—	—	—	—	—	—
		4	248	504	760	977	—	—	—	—	—	—	—	—
		5	200	408	616	808	992	—	—	—	—	—	—	—
		7	152	296	440	584	727	864	992	—	—	—	—	—
		12	088	184	264	344	440	520	600	680	776	850	923	992
OBERHEIM	Matrix12	5	210	412	612	812	996	—	—	—	—	—	—	—
	Matrix6	2	521	999	—	—	—	—	—	—	—	—	—	—
SEQUENTIAL	Pro-8	4	269	211	790	999	—	—	—	—	—	—	—	—
	Multitrack	4	248	509	763	959	—	—	—	—	—	—	—	—
PPG	WAVE2.2	4	264	520	776	999	—	—	—	—	—	—	—	—
E-mu	Emulator II	3	267	521	999	—	—	—	—	—	—	—	—	—
KURZWELL	250	5	221	425	630	831	999	—	—	—	—	—	—	—

c. Copying A Patch

DATA ENTRY

```
  ┌──┤─→ [ 0 ]─[ 9 ]  ├─┐
──┤  │                 ├──→ [ ENTER ]
  └──┤─→ [ ▲ ]  [ ▼ ]  ├─┘
   or │                │
```
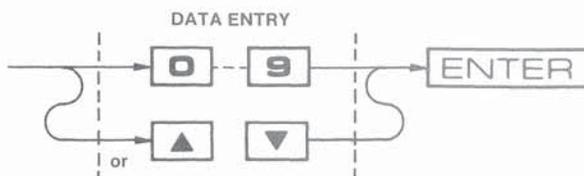
● First press ㉝ ENTER and hold whole pressing ㉖ MIDI ASSIGN KEY, then release both.

This procedure allows you to take the programmed information from one program location and copy it over to a second location. The initial location retains its programmed information. Before starting this procedure, it is necesssary to call up the program location you wish to copy. To do this, follow the procedure described in section 7.b.1). "Setting the program number".

Once you have arrived at the location you wish to copy, press ㉝ ENTER and ㉖ MIDI ASSIGN KEY as described in the flow chart. This causes the three digits of ⑮ STRING ASSIGN DISPLAY to blink, indicating that a copy program location needs to be entered. Enter the desired copy location using ⑯ DATA ENTRY KEYS or ⑰ INCREMENT/DECRE-MENT KEYS. The three digits will continue to blink. When the desired copy location has been entered press ㉝ ENTER. This puts the programmed information into the copy location and causes the digits to stop blinking.

Note: The MC1 provides 128 program locations, from 000 to 127. If a copy location greater than 127 is entered, and "error" indication will appear on the display. When this happens, simply enter in the desired copy location and continue with the procedure.

d. Editing A Program

Occasionally you will want to change, or edit an existing program within the MC1. This is quite simple to do, since the procedures for changing any part of a program are the same as those used when you first entered the program. So, when you have identified the parameter you wish to change, refer to the appropriate part of section 7.b. "Building A Program", and follow that procedure.

The IMC also lets you "audition" your edits without com-mitting them to memory. If, after listing to some changes, you wish to return to the original parameter setting, press ㉘ PROGRAM SELECT KEY before you press ㉝ ENTER. If you first press ENTER, the MC1 will memorize the last setting change.

You may also "dump" all contents of the MC1's memory. To do this, simply press ㉝ ENTER while you are powering up the unit. Before you do this, however, its advisable to review the programs you have in memory to see if its worth saving.

a. Playing the IMG2010 MIDI Guitar

The Ibanez MIDI guitar is designed to allow the player to adapt his or her own playing style to the system with little or no modification of technique. There are several tips, however, that can make using your Ibanez MIDI guitar system more enjoyable.

1) LEFT HAND TECHNIQUE

Because the hex pickup "reads" the vibration of the strings more sensitively than a standard guitar pickup, you may find that "stray" notes occur. These notes are usually present because the sensitivity control is set too high. It is also possible that certain aspects of your playing technique can cause this problem. Check to see if your left hand is touching other strings that you don't intend to play. This could trigger open strings to sound. If your thumb comes up over the neck, you could again trigger notes to play that you do not want. Adjusting the sensitivity control along with watching out for these left hand problems will eliminate these "stray" notes.

2) RIGHT HAND TECHNIQUE

After the sensitivity has been set on the controller and the sensitivity knob on the guitar has been set, you may find that certain notes do not trigger the synth. This is possibly caused by the way your picking hand is striking the strings. Because of how the hex pickup "reads" the strings vibration, it can miss notes altogether or add notes to what you intended to play, depending on how you pick. If you normally rest the palm of your right hand on the bridge, be careful not to brush the strings when you pick. Try to attack each string as evenly as you can to trigger the MIDI controller. By keeping these simple ideas in mind, you will receive maximum performance from the system.

3) PLAYING "TO" THE SOUND

The sounds available to you are provided by the synth you choose, but some general tips apply to getting the best results from the system. The attack and decay time of synth voices are different from one another in the same way that the attack and decay times of acoustic instruments differ. A rapid passage played on a piccolo cannot be duplicated on a tuba, for instance, but many first-time guitar synth players are disapointed in the results they acheive because they do not consider these natural differences. The attack/decay char-acteristics of each synth voice should be considered in your playing technique in order to get the best results.

b. Operating The MC1 MIDI Controller

The MC1 MIDI Controller is designed to be as easy as possible to operate while playing, so that you don't have to think about technology when you're thinking about music. There are just a few points about the MC1 you should be aware of when playing the Ibanez MIDI Guitar System.

1) When you first power up the MC1, it automatically enters the "Play Mode". This is the normal mode of operation when playing the MIDI Guitar System. In this mode of operation you may:

- Play the MIDI Guitar System.
- Change the display mode of ⑮ STRING ASSIGN DISPLAY.
- Call up any of the program locations.

- Use the synth voice "Hold" feature.
- Call up any of the programming, copying and editing functions described in sections 7.b. through 7.d. of this manual.

2) While in Play Mode the ⑬ PROGRAM DISPLAY will automatically switch between two display functions. When the MIDI Guitar is not played the selected program location will be displayed. While the MIDI Guitar is being played the ⑬ PROGRAM DISPLAY indicates the strings that are being played. Six vertical lines identify the strings, extending to full length when the string is played and returning to half-size when the string is not played.

3) While in Play Mode the ⑮ STRING ASSIGN DISPLAY may be switched to display one of three bits of information regarding the selected program location:

- Synth patch assignment.
- Program transposition setting.
- Activated strings.

Repeated pressings of ㉜ DISPLAY KEY will cause the display to step through the three possibilities. Also, ⑳ STRING SELECT INDICATOR, ㉑ KEY TRANSPOSE INDI-CATOR, and ㉒ ASSIGN INDICATOR will light to indicate which function is selected.

4) In Play Mode you can select any program location three different ways:

- Using the "Selecting Program Number" procedure out-lined in section 7.b.1). of this manual.
- Using the ⑰ INCREMENT/DECREMENT KEYS.
- Using the IFC60 Intelligent Foot Controller. This is de-scribed in section 8.c. of this manual.

5) The MC1 provides a "Hold" feature that is activated by a momentary-type footswitch (such as the Ibanez FS1M) plugged into the ㊱ REMOTE JACK on the rear panel. The footswitch acts like a "damper" or "sustain" pedal on a typical keyboard-type synth or an acoustic piano. When the footswitch is depressed, the synth voice will "decay out" at its maximum decay time, even when other notes are played. The effect of Hold feature will vary depending on the patch that is selected.

6) The MC1 provides an effects loop that is in the "guitar" signal line before it is mixed with the synth signal. The loop accomodates "instrument level" signal levels, meaning signals with an average level of -10 dBv. This is the typical level used with "guitar" type effects. When using gain-changing effects (such as distortion, compression, EQ, etc) avoid using large gain changes within the loop. This is easily done by adjusting the device's output level so that its level is the same with the effect out and in.

7) The MC1 also provides a three-position output level attenuator. This adjusts the level of all output signal levels of the MC1. In the "0 dB" position the output level is at its highest setting (attenuated by 0 dB), while in the "-30 dB" position the output level is at its lowest setting (attenuated by 30 dB). If the output level of the MC1 is too high (indicated by a distorted sound at any setting of the playback system volume control) set ㊸ LEVEL at the next lower setting and check the sound again. If the output level of the MC1 is too low (indicated by a low output level even with the playback system volume set on full) set ㊸ LEVEL at the next higher setting and check the sound again. Be sure to turn the volume of your playback system fully down before changing the setting of ㊸ LEVEL.

The Ibanez IFC60 Intelligent Foot Controller may be used to select the program location of the MC1 while in Play Mode. Connect the IFC60 to the ㊱ REMOTE JACK on the rear panel of the MC1, using the cable supplied with the IFC60. When the IFC60 is first powered up its display will first flash the IFC60's MIDI channel number three times, then it will automatically go to a preset program location (factory set to 127). If you wish to change either the IFC60's MIDI channel or the preset program location, refer to the IFC60 owner's manual.

The IFC60 divides the 128 program locations into 13 "banks" (from 00 to 12), each having up to 10 "patches" (from 0 to 9). The 3-digit display of the IFC60 and the ⑬ PROGRAM DISPLAY of the MC1 both display the selected program location, with the left two digits being the "bank" and the rightmost digit being the "patch". For example, a display of 068 indicates bank 06, patch 8. As with the MC1, program locations run from 000 to 127. Note that locations 128 and 129 do not exist.

To select a program location with the IFC60 select the desired "bank" with the rightmost switch of the IFC60. Pressing this switch once causes the bank to advance once. Pressing and holding will cause the IFC60 to step slowly through the banks. Once the desired bank is selected select the desired patch will once of the remaining patch switches of the IFC60. These switches have two patch numbers accociated with them. Pressing and holding one of these switches causes the IFC60 to "toggle" between the two patches of that switch. Once the desired patch number is reached, release the switch. The selected program location will be activated.

Note that when the IFC60 is hooked up to the MC1, you may still select program locations by using the front panel keys (see section 8.b.4). of this manual).

9 CAUTIONARY NOTES

When using the Ibanez MIDI Guitar System there are a few things to keep in mind to maintain proper operation.

● Keep the System clean, and free of dirt and dust.

● Avoid using the system in direct sunlight, or in confined areas that might cause the System to heat up.

● Mount the MC1 in a safe, secure rack or case. Avoid excessive vibration or mechanical shock to the System.

● When changing strings or string action, be sure to perform the calibration procedures outlined in section 5 of this manual.

● Avoid using the system near a radio or television.

● If the MC1's display blinks on power-up, the unit's memory backup battery is running low. Refer the unit to an authorized Ibanez Repair Center.

10 IN CASE OF DIFFICULTY

When a problem arises with the MIDI Guitar System the problem can, in many cases, be quickly solved by answering the following questions:

● Is the unit plugged into a live AC outlet and turned on? The display will light up indicating that the power is on.

● Are all inputs and outputs solidly connected to their respective jacks on the rear panel? Are all cables and connectors in good operating condition?

● Is your synth tuned to the same MIDI channel that the MC1 is assigned to? Can your synth accomodate the various transmission modes of the MC1? Refer to section 8.b. of this manual for information regarding the transmission modes of the MC1.

● If the synth is not responding to the guitar, have you:
* checked volume controls on the synth, guitar and playback system?
* put the MC1 in Play Mode (refer to section 8.b.)?
* checked operation in all positions of ⑥ MODE SELECTION SWITCH? This will indicate which operation mode is not responding.
* activated strings for this patch (refer to section 7.b.6)?

● If the synth is not responding to guitar string bends, is the bend function activated on the synth?

● If the synth responds to string bends chromatically, is the MC1 set for non-chromatic operation (refer to section 7.b.8)? If only one MIDI channel is used, be sure to play monophonically when bending strings.

● Are you familiar with all of the features and functions of the MIDI Guitar System? If not, please take the time to read this manual carefully.

Every effort has been made to insure trouble-free operation of your MIDI Guitar System. If problems persist, contact your authorized Ibanez dealer for assistance.

■ MIDI GUITAR IMG2010

- Body .... Maple
- Neck .... Maple 1pc. w/GFRP Bar
  22 Frets
- Fingerboard .... Ebony
- Hardware .... String Lock on Headstock
  Bridge and Tailpiece
- Control .... Master Volume / Master Tone
  Balancer / Sensitivity
  Velocity / CTL. Change
  Electronic Bend Arm
- Pickup .... Humbucking Pickup × 2
  Hex Pickup
- Finish .... BK (Black)
  SP (Silver Pearl)

■ MIDI GUITAR CONTROLLER MC1

- Input/Output Jack .... MIDI Out A and B / Remote Footswitch Jack
  Guitar In / Synth In A and B
  Hold Footswitch Jack / Effect Send Return
  Guitar Out / Mix Out (0dB, −15 dB, −30dB)
- Input Impedance .... 25 kΩ (Synth A)
  25 kΩ (Synth B)
  25 kΩ (Effect Return)
- Output Impedance .... 500 Ω (Effect Send)
  500 Ω (Guitar Out)
  1 kΩ (Mix Out 0dB)
  500 Ω (Mix Out −15dB)
  500 Ω (Mix Out −30dB)
- Frequency Response .... $20Hz\sim20kHz$ ($\pm^{0}_{3.5}dB$ Synth In, Return → Mix Out)

  $20Hz\sim20kHz$ ($\pm^{0}_{3.5}dB$ Return → Guitar Out)
- Maximum Input Level .... +7.5dBv (Synth In, Return 1kHz THD=3%)
- Maximum Output Level .... +6.5dBv (Guitar Out, Mix Out 1kHz THD=3%)
- Equivalent Input Noise .... −91dBv (Mix Out/Synth In, Return Shorting IHF-A)
  −90dBv (Guitar Out/Synth In, Return Shorting IHF-A)
- MIDI .... Program Number 0~127
  MIDI Channel 1~16
- Power Requirement .... 120V AC 60Hz 12W
  220V AC 50Hz 13W
  240V AC 50Hz 14W
- Dimensions .... 482mm (w) × 265mm (d) × 44mm (h)
- Weight 3.6kg

12 BLOCK DIAGRAM
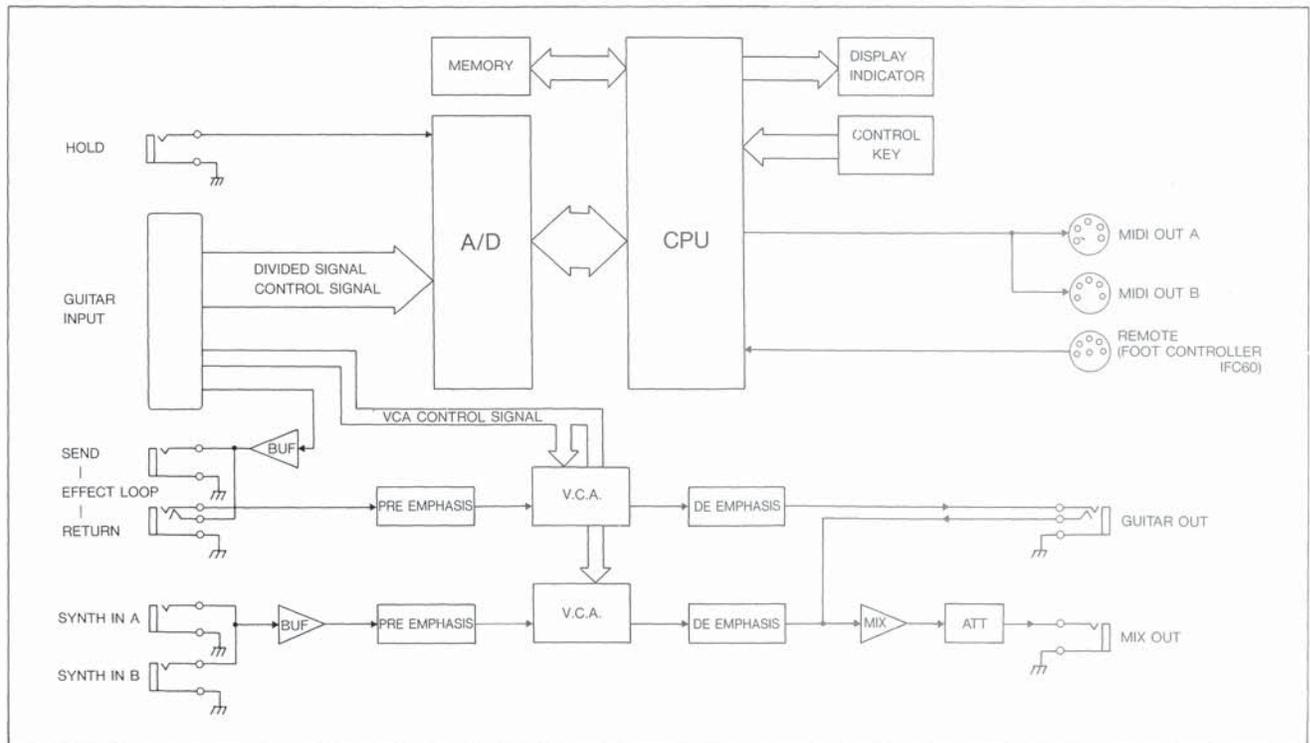
The IMG2010 MIDI Guitar may be used with another popular guitar synth system using the same multi-pin connector. Also, the guitar from this system may be used with the MC1 MIDI Controller, again using the multi-pin connector. The diagrams below show the various possible combinations.

● **IMG2010 with the MC1**

This all-Ibanez system is the one discussed in this manual. All controls on board the IMG2010 may be used, and guitar performance (note tracking, string bends, etc) are optimized for this system combination.
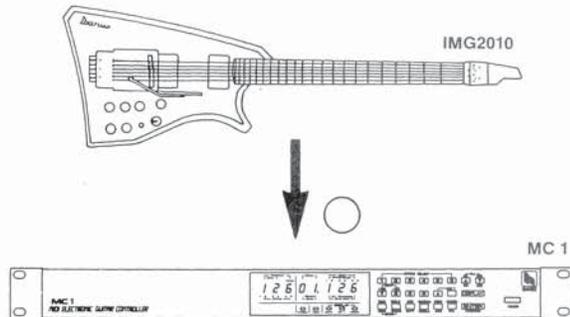
● **IMG2010 with the other synth/controller**

The controls on the IMG2010 are pre-assigned to specific synth functions. Refer to the owners manual of the synth/controller for information regarding these functions.

OTHER SYNTH/CONTROLLER
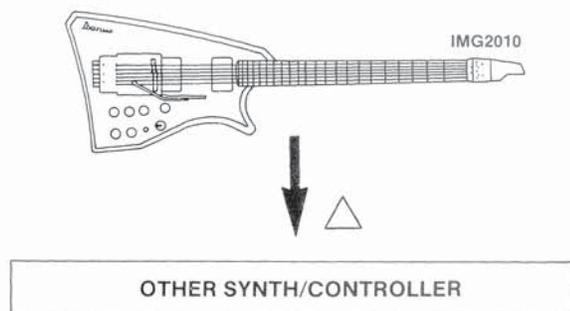
● **Other guitar with the MC1**

The controls on this guitar will take on the functions of the controls on the IMG2010. Refer to section 3.a. of this manual for a description of these controls.

OTHER GUITAR
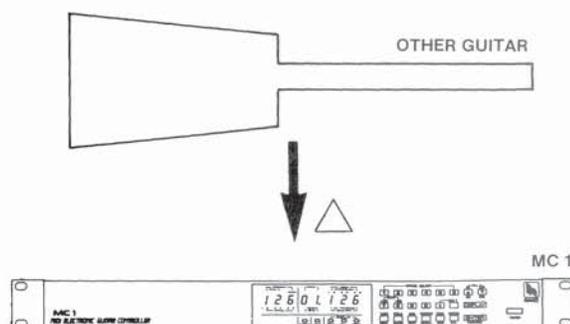
A word of caution

While the various combinations listed above will operate satisfactorily, it is strongly recommended that the "all-Ibanez" system be used. This will provide all of the control features that were designed into the Ibanez MIDI Guitar System, and will give full advantage of the advanced Ibanez MIDI Note-Tracking technology.

CHANNEL MESSAGES

STATUS	SECOND	THIRD	DESCRIPTION
1001 nnnn	0kkk kkkk	0vvv vvvv	Note On kkkkkkk = 16~103 vvvvvvv = 1~127 vvvvvvv = 0 ; Note Off
1011 nnnn	0ccc cccc	0vvv vvvv	Control Change ccccccc = 0~31 (Note 1) vvvvvvv = 0~127
1011 nnnn 1011 nnnn	0100 0000 0100 0000	0111 1111 0000 0000	Hold Pedal On Hold Pedal Off
1100 nnnn	0ppp pppp		Program Change ppppppp = 0~127
1110 nnnn	0vvv vvvv	0vvv vvvv	Pitch Bender Change
1011 nnnn	0111 1011	0000 0000	All Notes Off

nnnn = 0~15: You can select channel number for each string.

Note 1: You can set up control number (ccc cccc = 0~31) for the CTL Change Knob and the Electronic Bender Arm.

SYSTEM REAL TIME MESSAGES

STATUS	
1111 1110	Active Sensing (Note 2)

Note 2: MC1 sends signals approximately every 82 msec.

[MIDI GUITAR]
MODEL MC1

Date: 3/5, 1986
Version: 1.1

Function . . .		Transmitted	Recognized	Remarks
Basic Channel	Default	1 — 16		For each string program MIDI CH. assignment.
	Chaged	1 — 16		
Mode	Default	3		
	Messages	×		
	Altered	* * * * * * * * * * * * * *		
Note Number :		16 — 103		
	True voice	* * * * * * * * * * * * * *		
Velocity	Note ON	○ 9nH, V=1-127		
	Note OFF	× 9nH, V=0		
After Touch	Key's	×		
	Ch's	×		
Pitch Bender		○		
Control Change	0 — 31*	○ (CTL CHANGE)		
	0 — 31*	○ (BENDER ARM)		
	64	○ (HOLD PEDAL)		
Prog Change :		○ (0 — 127)		
	True #	* * * * * * * * * * * * * *		
System Exclusive		×		
System : Common :	Song Pos	×		
	Song Sel	×		
	Tune	×		
System : Real Time :	Clock	×		
	Commands	×		
Aux :	Local ON/OFF	×		
:	All Notes OFF	○ (123)		
Mes- :	Active Sense	○		
sages :	Reset	×		
Notes		*It will be stored in a memory (programmable).		

Mode 1 : OMNI ON, POLY.   Mode 2 : OMNI ON, MONO.   ○ : Yes
Mode 3 : OMNI OFF, POLY.   Mode 4 : OMNI OFF, MONO.   × : No