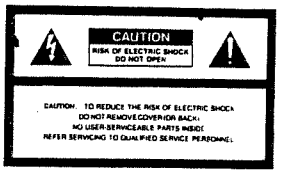
Roland

MIDI PAD-MIDI INTERFACE

PM-16

Owner's Manual



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK OR INJURY TO PERSONS.

IMPORTANT SAFETY INSTRUCTIONS

WARNING When using electric products, basic precautions should always be followed, including the following;

1. Read all the instructions before using the product.
2. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. Do not use this product near water- for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
4. This product should be used only with a cart or stand that is recommended by the manufacture.
5. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss.
   Do not operate for a long period of time at a high volume level or at level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
6. The product should be located so that its location or position does not interfere with its proper ventilation.
7. The product should be located away from heat sources such as radiators, heat registers or other products that produce heat.
8. The product should avoid using in where it may be effected by dust.
9. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
10. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
11. Do not tread on the power-supply cord.
12. Do not pull the cord but hold the plug when unplugging.
13. When setting up with any other instruments, the procedure should be followed in accordance with instruction manual.
14. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
15. The product should be serviced by qualified service personnel when:
    - A: The power-supply cord or the plug has been damaged; or
    - B: Objects have fallen, or liquid has been spilled into the product; or
    - C: The product has been exposed to rain; or
    - D: The product does not appear to operate normally or exhibits a marked change in performance: or
    - E: The product has been dropped, or the enclosure damaged.
16. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS

ADVARSEL!

Lithiumbatteri. Eksplosionsfare.
Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanual.

VARNING!

Lithiumbatteri. Explosionsrisk.
Får endast bytas av behörig servicetekniker.
Se instruktioner i servicemanualen.

ADVARSEL!

Lithiumbatteri. Fare for eksplotion.
Må bare skiftes av kvalifisert tekniker som beskrevet i servicemanualen.

VAROITUS!

Lithiumparisto. Räjähdysvaara.
Pariston saa vaihtaa ainoastaan alan ammottimies.

WARNING

THIS APPARATUS MUST BE EARTH GROUNDED.

The three conductors of the mains lead attached to this apparatus are identified with color as shown in the table below, together with the matching terminal on the UK type power plug. When connecting the mains lead to a plug, be sure to connect each conductor to the correct terminal, as indicated.
"This instruction applies to the product for United Kingdom."

MAINS LEADS		PLUG
Conductor	Color	Mark on the matching terminal
Live	Brown	Red or letter L
Neutral	Blue	Black or letter N
Grounding	Green-Yellow	Green, Green-Yellow, letter E or symbol

Bescheinigung des Herstellers /Importeurs

Hiermit wird bescheinigt, daß der/die/das

ROLAND PAD-MIDI INTERFACE PM-16

(Gerat, Typ. Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

Amtsbl. Vfg 1046 / 1984

(Amtsblattverfugung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Roland Corporation Osaka / Japan

Name des Herstellers/Importeurs

RADIO AND TELEVISION INTERFERENCE

"Warning – This equipment has been verified to comply with the limits for a Class B computing device, pursuant to Subpart J, of Part 15, of FCC rules. Operation with non-certified or non-verified equipment is likely to result in interference to radio and TV reception."

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly, that is, in strict accordance with our instructions, it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J, of Part 15, of FCC Rules. These rules are designed to provide reasonable protection against such a interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by the following measure:

- Disconnect other devices and their input/output cables one at a time. If the interference stops, it is caused by either the other device or its I/O cable.
  These devices usually require Roland designated shielded I/O cables. For Roland devices, you can obtain the proper shielded cable from your dealer. For non Roland devices, contact the manufacturer or dealer for assistance.
  If your equipment does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:
- Turn the TV or radio antenna until the interferences stops.
- Move the equipment to one side or the other of the TV or radio.
- Move the equipment farther away from the TV or radio.
- Plug the equipment into an outlet that is on a different circuit than the TV or radio. (That is, make certain the equipment and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and TV.

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

Please read the separate volume "MIDI", before reading this owner's manual.

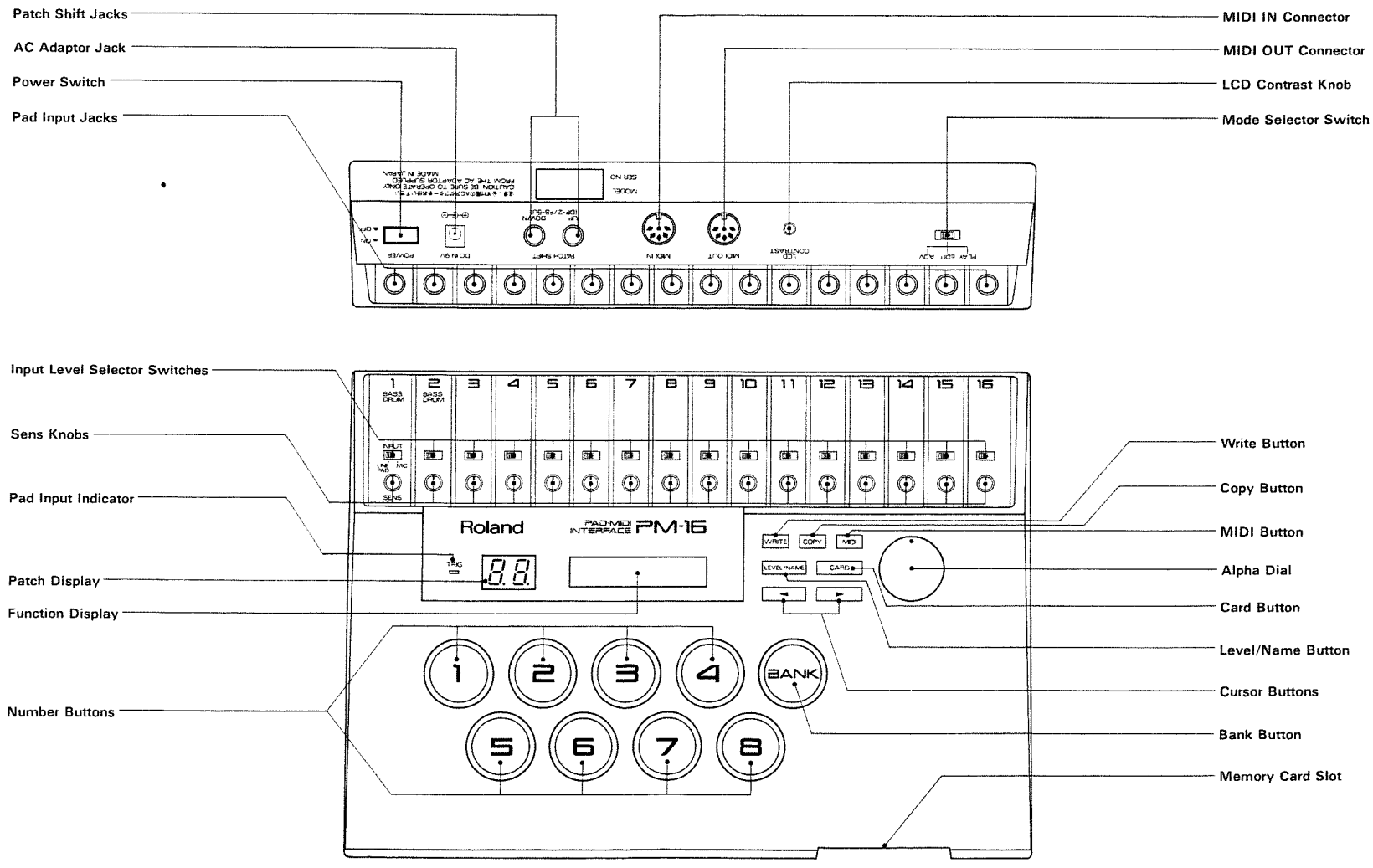
CORRECTION TABLE OF THE PM-16 MANUAL

	[Wrong]		[Correct]
P.1,right column, 2nd line	1with which the pad is struck (Bend Depth/Bend Decay, Dynamics Bend)	➡	of each drum-beat (Dynamics pitch)
P.6,4th line	PM-1Step 6	➡	PM-16
P.6,6th line	Step Step 1	➡	Step 1
P.11,5th line	Step 10	➡	Channel 10
P.13,5th line	Step 10	➡	Channel 10
P.15,5th line	Step 10	➡	Channel 10
P.25,2nd line	Step 2	➡	Step 3
P.28,6th line	PM-1Step 6	➡	PM-16
P.29,at the bottom	Add -- The Threshold values of Inputs 1 and 2 are preprogrammed to 20, and the other Inputs to zero.When using the PD-11, the Bass Drum may sound twice by kicking it once.This, however can be quite often resolved by increasing the Threshold level.		
P.36,12th line	120 and 126	➡	110 and 125
P.37,5th line	as explained below	➡	as explained on page 36
P.40,1st line in the table	Display Parameter	➡	Parameter Variable Range
P.47,9th line	(Bend Depth/Bend Decay/Dynamics Bend)	➡	(Dynamics pitch)
P.78,in the block diagram	MIDI Sound Module	➡	Converter to MIDI
P.79,1st line	Set to MIDI ON	➡	Set to MIDI MIX ON
P.79,2nd line	or MIDI OFF	➡	or MIDI MIX OFF
P.88,right colum, 21st line	Add -- MIDI Cable		

Roland

'87-8-B3-1S

CONTENTS


Patch Shift Jacks
AC Adaptor Jack
Power Switch
Pad Input Jacks
MIDI IN Connector
MIDI OUT Connector
LCD Contrast Knob
Mode Selector Switch
Input Level Selector Switches
Sens Knobs
Pad Input Indicator
Patch Display
Function Display
Number Buttons
Write Button
Copy Button
MIDI Button
Alpha Dial
Card Button
Level/Name Button
Cursor Buttons
Bank Button
Memory Card Slot
Roland
PAD-MIDI INTERFACE PM-16
WRITE
COPY
MIDI
LEVEL/NAME
CARD
BANK

IMPORTANT NOTES

< About the Power Supply >

- Make sure you use the appropriate power supply for your area. When using the PM-16, use the correct kind of PM-16 AC adaptor for the line voltage in your area. There are usually three types available : 120, 220, and 240 volts. Consult your Roland service center for details.
- The PM-16 is made to be used with its own AC adapter. Please always use the supplied AC adapter. Using any other AC adaptor could cause a malfunction of some kind. Similarly, please do not use the accompanying AC adaptor with any electric appliance other than the PM-16. This too could cause malfunction.
- Make sure that you have connected the AC adaptor to the PM-16 before turning the power ON.
- Do not plug the PM-16 into a socket that is supplying power to any noise generating device such as a motor, a variable lighting system, or any piece of equipment that has a large power intake.
- When unplugging, always hold the plug itself and not the cable, in order to prevent short circuiting the power.
- Remove the AC adaptor from the wall socket after use.

<Where to install>

- Do not place the PM-16 in any of the following locations. Malfunctions may result if it is placed where :
  - ○there is excessive heat (in direct sunlight, beside or on a heater, etc.)
  - ○there is excessive humidity
  - ○there is a lot of vibration
- Do not leave the PM-16 where it is exposed to direct sunlight or inside a closed car for a long period of time. Excessive heat could cause the cabinet to warp.
- Avoid placing the PM-16 near a neon or fluorescent light or near a cathode ray tube (television or computer display) because these devices generate noise.
- Do not place or drop anything heavy on the main unit or its power cable because this could damage either of these.

<Cleaning>

- For daily cleaning, wipe the PM-16 with a soft dry cloth.
- If the main unit becomes dirty, wipe it with a slightly damp cloth.
- Should the main unit become unusually dirty, clean it with a neutral detergent. Then wipe it with a soft dry cloth.
- Do not clean with solvents such as paint thinner, benzine, or alcohol, as these can cause deformation or discoloration.

<Memory Backup that is retaining the contents of the memory>

- The PM-16 comes equipped with a back-up memory run by a battery that retains data in the memory even after the unit is turned off. The battery has a life of slightly longer than five years so we recommend that you change it every five years. Call your Roland service center for assistance when you want to change the battery.
  - ＊It may be necessary to change the first battery before five years have expired, depending upon how long the battery was installed before you purchased the unit.
- Although we do everything we can to protect your data during repairs, sometimes, especially when working on the memory itself or on a related area, some of your important data may be lost. Keep a separate record of all the data that you consider essential. This can be done by saving it onto the optional memory card "M-128D" or by writing it down on a sheet of paper.

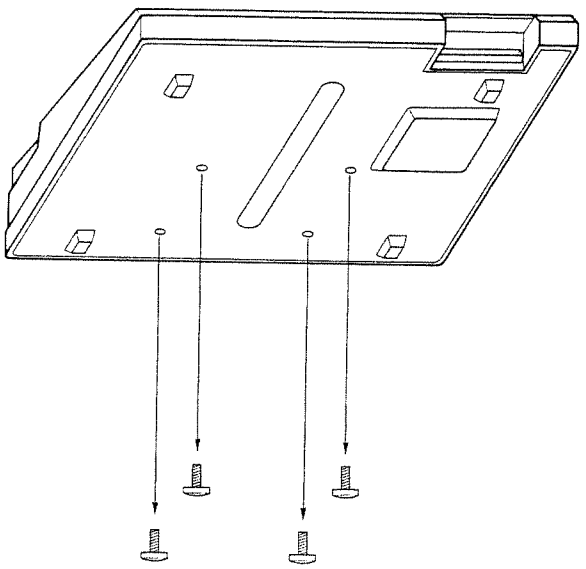
<Miscellaneous>

- Never put foreign matter (a coin, a wire, etc.) into the PM-16. Never spill liquids (water, soft drinks, liquor, etc.) onto it either.
- The liquid crystal may be hard to read from some angles. Adjust the contrast with the LCD Contrast Dial located at the rear of the main unit to account for this.
- Never push or hit the display.

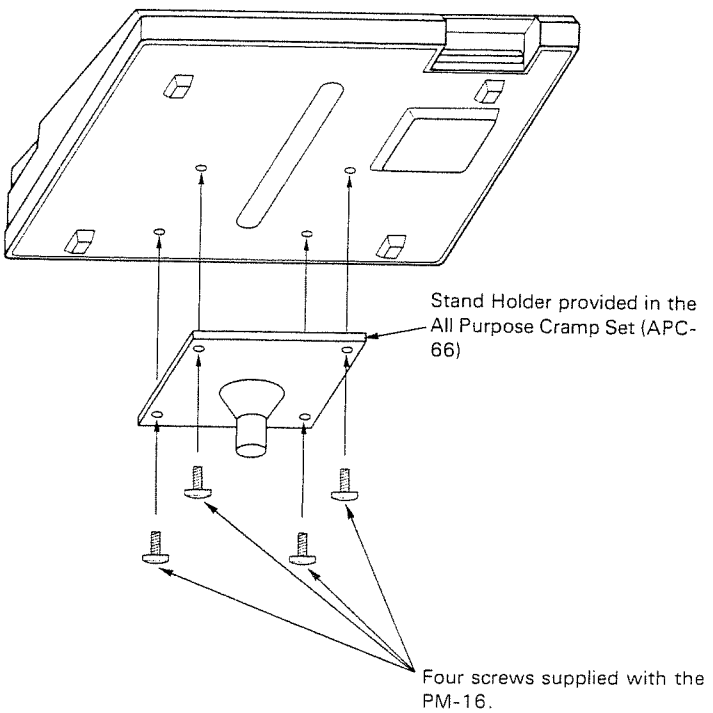
Installing the PM−16 on the optional Pad Stand (MDS−1)

To install the PM−16 onto the optional Pad Stand (MDS−1) using the Stand Holder from the All Purpose Clamp Set APC−66, do the following :

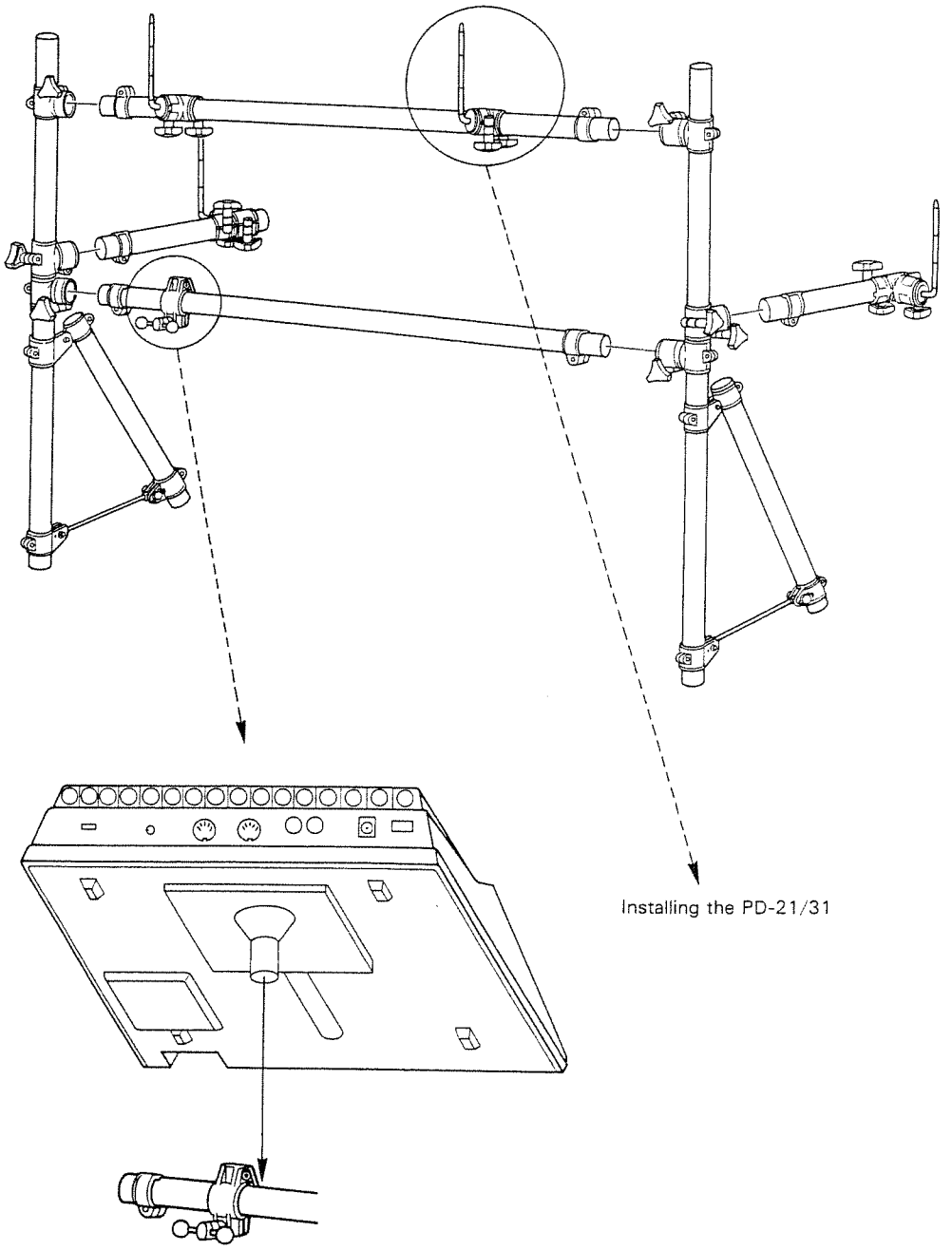
①Remove the four screws (4x8mm) found on the bottom of the PM−the PM−16



②Attach the Stand Holder from the All Purpose Clamp Set to the bottom of the PM−16 with the four screws removed in Step 1

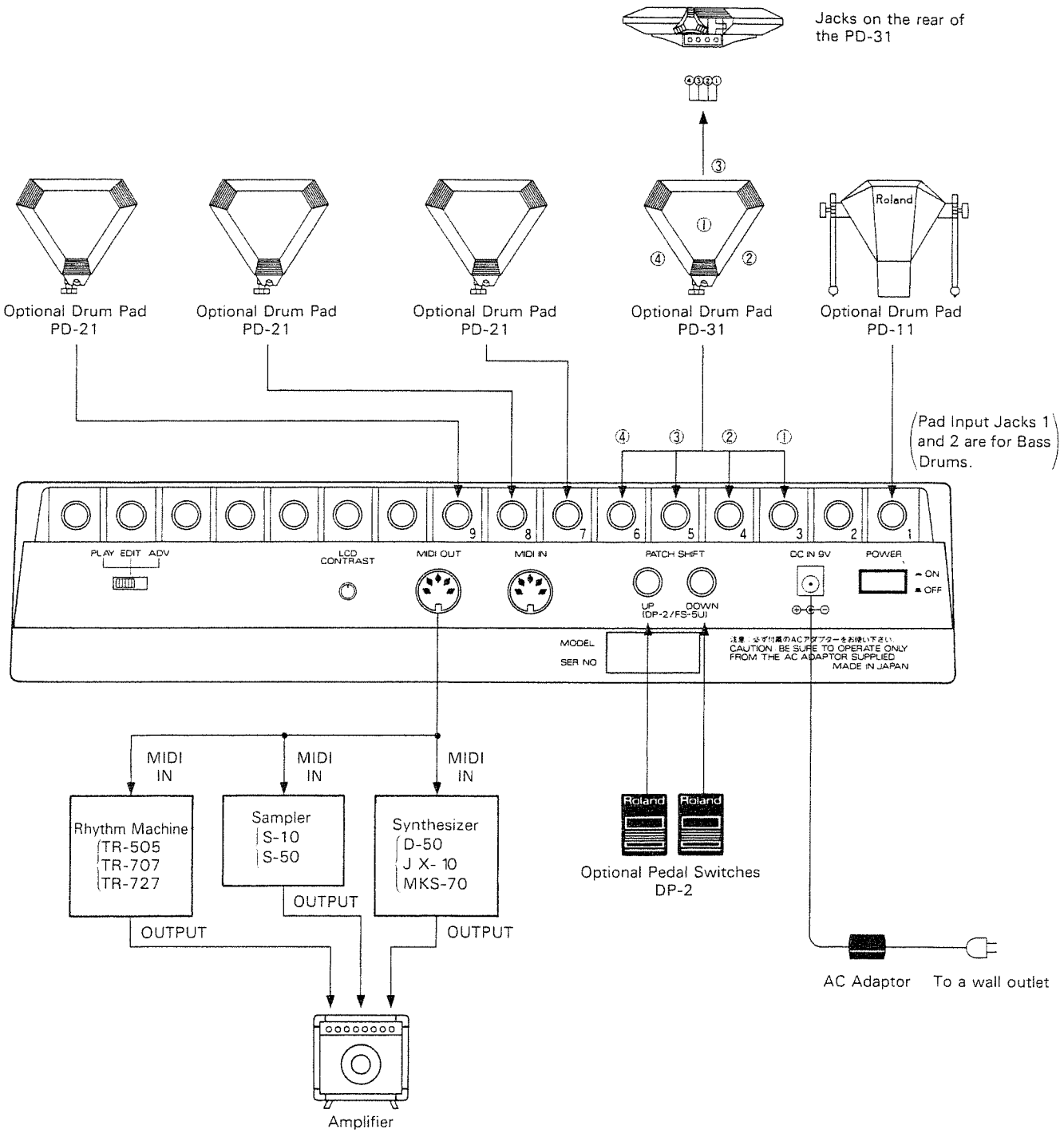


③Install the PM－16 and Stand Holder onto the Pad Stand (MDS－1) as shown in the figure below.



Installing the PD-21/31

1 CONNECTIONS



■ About The Pads PD-11/21/31 (optional)

The Pads PD-11/21/31 are to be used exclusively with the PM-16.

The PD-11 is a bass drum pad.

The PD-21 is a snare or tom drum pad.

The PD-31 is also a snare or tom drum pad (with a three-sided rim sensor output).

*When using the PD-31's rim sensors and face output, you may hear sounds from a part that you are not striking, depending on the way you hit the pad, and on the setting of the sensitivity knobs. Adjust the signal output levels of the face and each rim, according to the instructions given in [How to adjust the input level] on p.36. This adjustment reduces sounds from the unused faces to the minimum.

2 Making A Rhythm Machine Work As A Sound Source

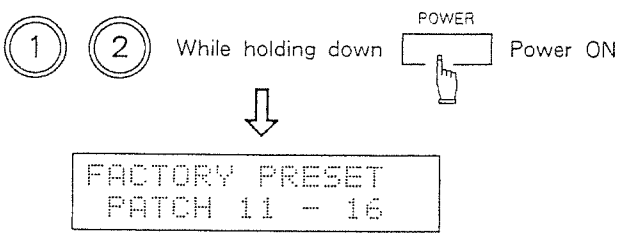
The PM-16 is an instrument designed to use MIDI sound sources via electronic drum pads (such as the PD-11, 21, and 31, which are optional).

When you use the TR-505, the TR-707, or the TR-727 as your MIDI sound source, you can use the factory presets (which are the settings made at the factory) to more easily set-up your sounds. If you change the settings or put a different setting into memory, the factory preset can be easily recalled by carrying out the following operation.

[Recalling the Factory Presets]

Step 1 Turn the power OFF.

Step 2 While holding the number keys 1 and 2 down, turn the power back ON.



This operation changes Patch Numbers 11 to 16 (See p. 17.) to the factory presets. Numbers 17 to 88 will not be affected.

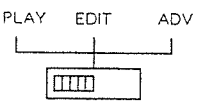
■When using the TR−505 as the sound source

Step 1 Connect the pads (PD−11/21/31), the PM−16, the sound source (TR−505), the amplifier, the speakers, and so on. (See p. 8)

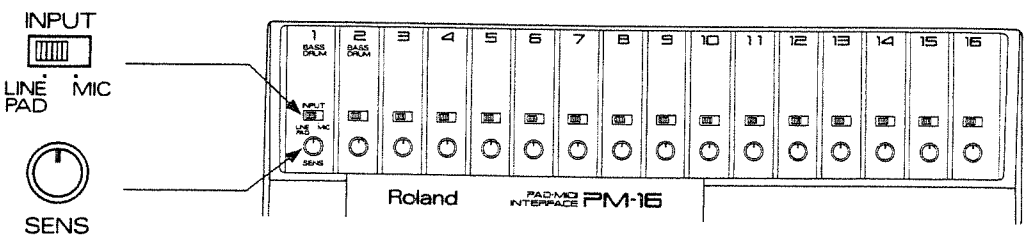
Step 2 Turn the PM−16 and the other connected devices ON.

Step 3 Set the MIDI Receive Channel of the TR−505 to channel 10. Set the correspondence between the sound source and the key number (note number) to the factory preset positions. (See p.39−40 of the TR−505 Owner's Manual.)

Step 4 Put the PM−16 into Play mode.

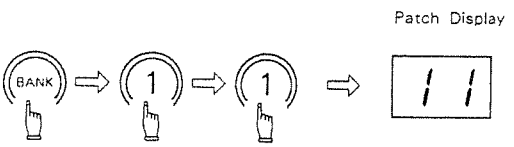


Step 5 Set all of the Input Levels to LINE/PAD and also set their corresponding sensitivity knobs to their center position.



If the Factory Preset has been erased or changed, recall it as explained above in 【Recalling the Factory Presets】.

Step 6 Press the Bank Button and the Number Buttons as shown in the figure below.



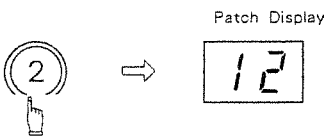
Step 7 Hit the pad connected to the PM−16.

(Strings)
Hitting the pad will cause the sound corresponding to the pad number (the number of the Pad Input Jack to which the pad is connected) to be emitted.

Patch 11 (for TR-505)

Pad Number (Number of Pad Input Jack)	Instrument	Note Number
1	Bass Drum	35
3	Snare Drum	38
4	Hi Conga	62
5	Rim Shot	37
6	Low Conga	63
7	Hi Tom	48
8	Mid Tom	45
9	Low Tom	41

Step 8 **Press the Number Button 2.**



Step 9 **Hit the pad connected to the PM-16.**

This time, the sound source will differ from that of Patch Step 11.

Patch 12 (for TR-505)

Pad Number (Number of Pad Input Jack)	Instrument	Note Number
1	Bass Drum	35
3	Snare Drum	38
4	Hi Cowbell	67
5	Timbale	65
6	Low Cowbell	68
7	Crash Cymbal	49
8	Ride Cymbal	51
9	Hand Clap	39

If you would like to change the correspondence between the pad that you want to play and the sound ,source or to make a new patch with a different correspondence written into it, read OPERATION I on p.17 to 38.

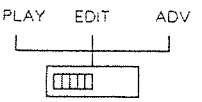
■When Using the TR−707 as the sound source

Step 1 Connect the pads (PD−11/21/31), the PM−16, the sound source (TR−707), the amplifier, the speakers, and so on. (See p. 8.)

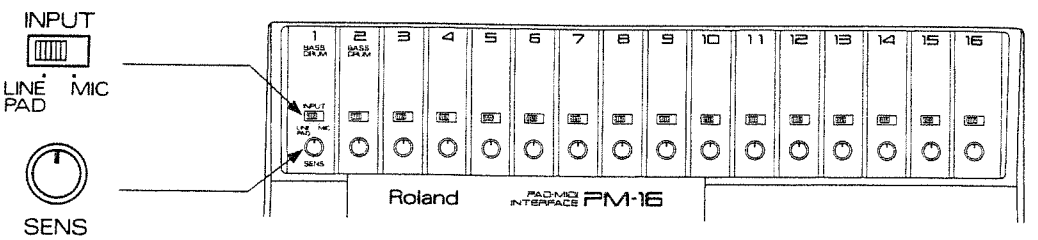
Step 2 Turn the PM−16 and the other connected devices ON.

Step 3 Set the MIDI Receive Channel of the TR−707 to channel 10 Set the correspondence between the sound source and the key number (note number) to the factory preset position. (See p.44 of the TR−707 Owner's Manual.)

Step 4 Put the PM−16 into Play mode.

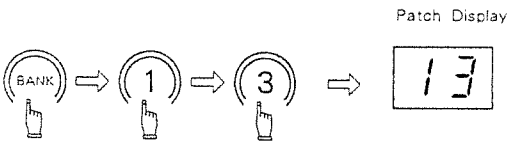


Step 5 Set all of the Input Levels to LINE/PAD and also set their corresponding sensitivity knobs to their center position.



If the Factory Preset has been erased or changed, recall it as explained above in 【Recalling the Factory Presets】.

Step 6 Press the Bank Button and the Number Buttons as shown in the figure below.



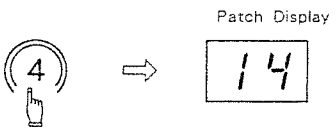
Step 7 Hit the pad connected to the PM−16.

Striking the pad will cause the sound corresponding to the pad number (the number of the Pad Input Jack to which the pad is connected) to be emitted.

Patch 13 (for TR-707)

Pad Number (Number of Pad Input Jack)	Instrument	Note Nubmer
1	Bass Drum	35
3	Snare Drum	38
4	Cowbell	56
5	Rim Shot	37
6	Tambourine	54
7	Hi Tom	48
8	Mid Tom	45
9	Low Tom	41

Step 8 **Press the Number Button 4.**



Step 9 **Hit the pad connected to the PM-16.**

This time, the sound source will differ from that of Patch 13.

Patch 14 (for TR-707)

Pad Number (Number of Pad Input Jack)	Instrument	Note Number
1	Bass Drum	36
3	Snare Drum	40
4	Hi Tom	48
5	Mid Tom	45
6	Low Tom	41
7	Crash Cymbal	49
8	Ride Cymbal	51
9	Hand Clap	39

If you would like to change the correspondence between the pad that you want to play and the sound source, or to make a new patch with a different correspondence written into it, read OPERATION 1 on p. 17 to 38.

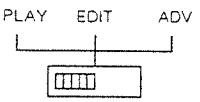
■When using the TR－727 as the sound source

Step 1　Connect the pads (PD－11／21／31), the PM－16, the sound source (TR－727), the amplifier, the speakers, and so on. (See p. 8)

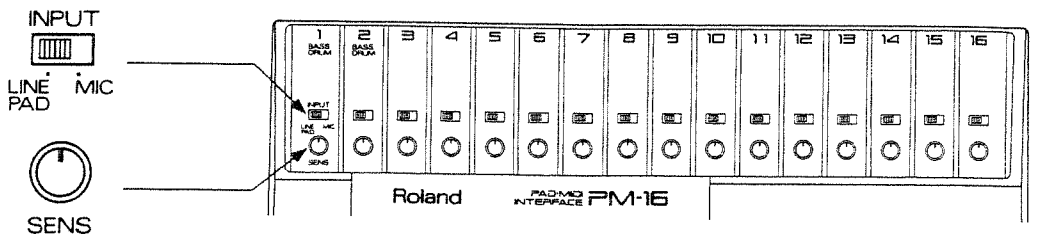
Step 2　Turn the PM－16 and the other connected devices ON.

Step 3　Set the MIDI Receive Channel of the TR－727 to channel 10 Set the correspondence between the sound source and the key number (note number) to the factory preset positions. (See p.44 of the TR－727 Owner's Manual.)

Step 4　Put the PM－16 into Play mode.

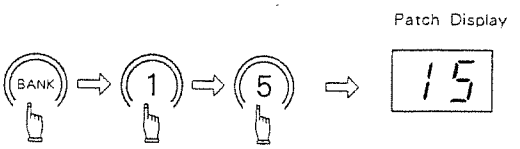


Step 5　Set all of the Input Levels to LINE／PAD and also set their corresponding sensitivity knobs to their center position.



If the Factory Preset has been erased or changed, recall it as explained above in 【Recalling the Factory Presets】.

Step 6　Press the Bank Button and the Number Buttons as shown in the figure below.



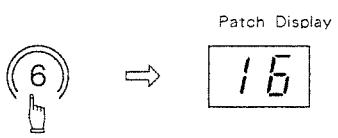
Step 7　Hit the pad connected to the PM－16.

Striking the pad will cause the sound corresponding to the pad number (the number of the Pad Input Jack to which the pad is connected) to be emitted.

Patch 15 (for TR-727)

Pad Number (Number of Pad Input Jack)	Instrument	Note Number
3	Hi Bongo	60
4	Low Bongo	61
5	Mute Hi Conga	62
6	Open Hi Conga	63
7	Low Conga	64
8	Hi Timbale	65
9	Low Timbale	66
10	Hi Agogo	67

Step 8 **Press the Number Button 6.**



Step 9 **Hit the pad connected to the PM-16.**

This time, the sound source will differ from that of Patch 15.

Patch 16 (for TR-727)

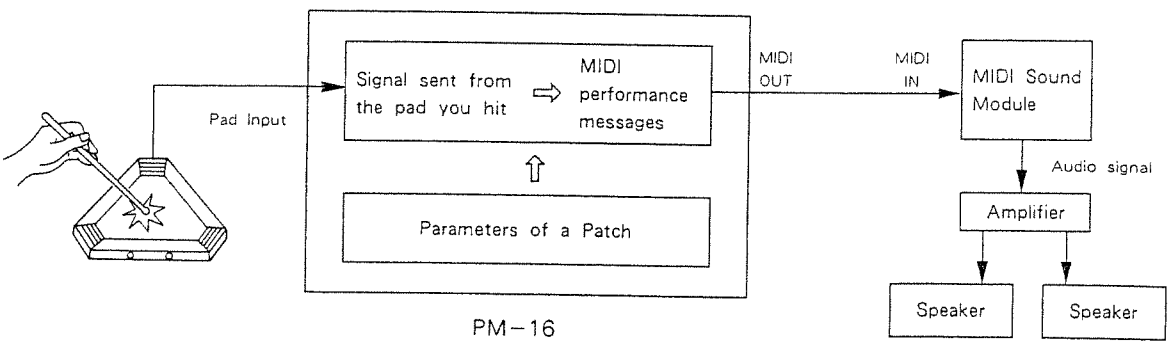
Pad Number (Number of Pad Input Jack)	Instrument	Note Number
3	Low Agogo	68
4	Cabasa	69
5	Maracas	70
6	Short Whistle	71
7	Short Whistle	71
8	Long Whistle	72
9	Quijada	73
10	Star Chime	74

If you would like to change the correspondence between the pad that you want to play and the sound source, or to make a new patch with a different correspondence written into it, read OPERATION 1 on p. 17 to 38.

3 OPERATION I (Basic)

1. Description of the Modes and How to Operate Them

The PM−16 is a MIDI converter that converts signals, which we call trigger signals, into MIDI signals. The trigger signals are generated by beating an electronic drum pad (such as the optional PD−11/21/31 pads) and then emitted as sounds by the MIDI sound source.



The combination of settings within the PM−16 that convert the signals sent from the pad as it is struck into MIDI messages, is called a patch. Up to 64 patches can be stored in the main unit's memory.

The patches are arranged by numbers, which we call Patch Numbers and in groups (11−18, 21−28, . . .71−78, 81−88).

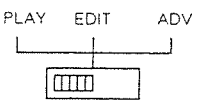
To play the electronic drums, you simply connect them (See p.8), choose one of the patches, and then hit the pad to make the MIDI sound source emit sound. However, in order to make the MIDI sound source generate a sound using the PM−16, you need to set the values of the elements (parameters) inside the patch, according to the MIDI sound source that you are using. This setting of patch elements (parameters) is called editing.

The PM−16 has two modes in which you can edit patch elements. One is Basic Edit Mode, in which you edit only the fundamental elements necessary, so that the MIDI sound source will work at all. The other is the Advanced Edit Mode, in which you can edit more elements in order to give more variation to your performance.

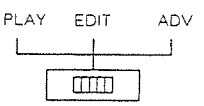
As opposed to these two editing modes, there is the Play Mode in which you actually play the drums. Patches can only be changed in Play Mode. When you want to edit the contents of a patch you must first choose the patch you want to edit in the Play Mode, and then edit it in the Basic or Advanced Edit Mode.

Use the Mode Switch to change modes.

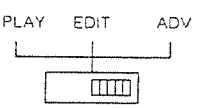
Play Mode



Basic Edit Mode

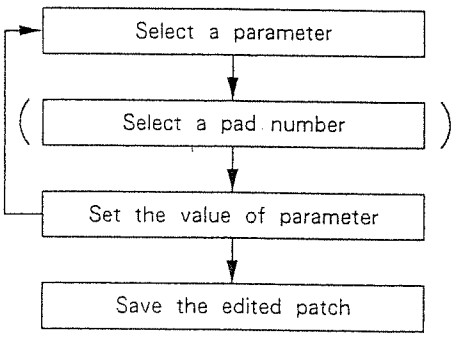


Advanced Edit Mode

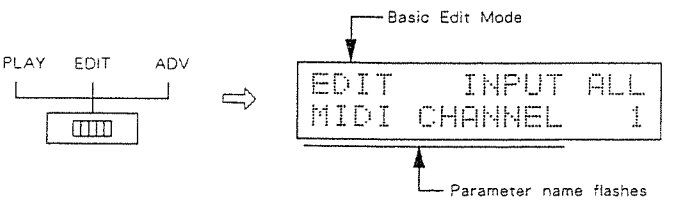


2. Basic Edit Mode

You can only edit fundamental elements (parameters) in the Basic Edit Mode. The following figure is an outline of how to operate in this mode.



Set the Mode Switch to EDIT, to begin working in the Basic Edit Mode.



a. Calling the elements to be set

The elements (parameters) that you can set in the Basic Edit Mode are shown below, with the ranges to which they can be set.

Parameter	Variable Range
MIDI Channel	1–16
Note Number	0–127
Program Change	
MIDI Channel	1–16
Number	1–128, OFF
Gate Time	AUTO, 1–60
Threshold	0–99

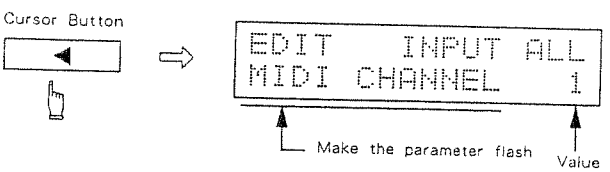
Of these five elements, Note Number and Threshold can be set to different values for each pad input. MIDI Channel and Gate Time are set to the same values for every pad input. Program Change is set to one value for each patch.

To get the MIDI sound source to emit sounds when you are striking a pad connected to the PM–16, at least the MIDI Channel and Note Number must be set.

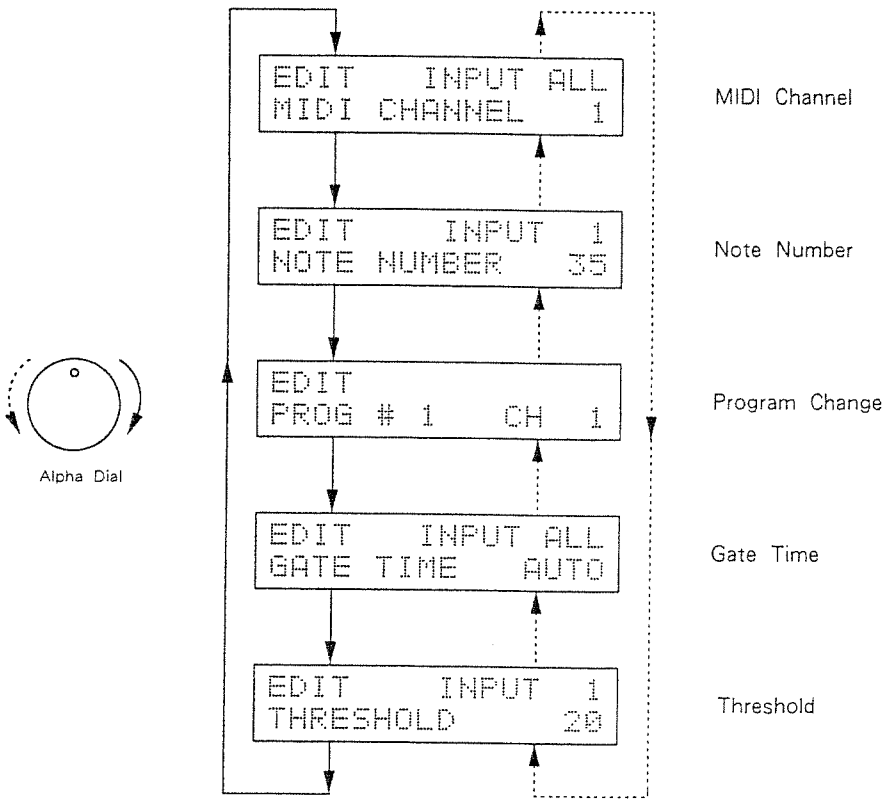
The following operation allows you to call each respective element, and check the value to which it is currently set.

Step 1 **Make sure the PM–16 is in the Basic Edit Mode.**

Step 2 **If the element name is not flashing, press the Cursor Button to make it flash.**



Step 3 Turn the Alpha Dial. The five element names and their current values will appear in the Display in turn.

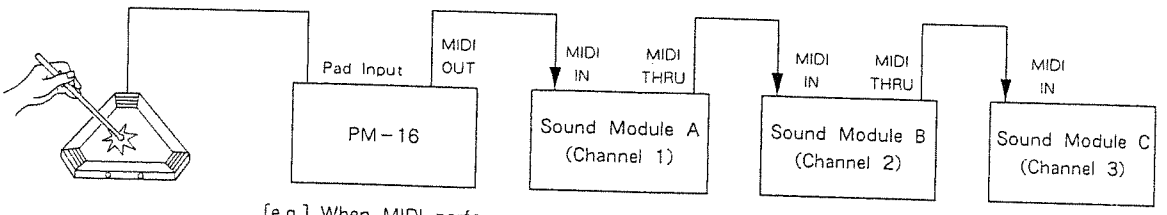


b. The function and setting of each element

1) Making the PM-16's MIDI channel correspond with that of the sound source (MIDI Channel)

MIDI has several channels (parameters), which allows you to have more than one MIDI sound source, each performing differently from the others,while using only a single cable. When MIDI performance information is sent to the sound source, the sender (PM-16) always specifies which channel to use. This channel permits the receiver (sound source) to receive only the necessary performance information, and then to make sounds in accordance with them.

For example, by changing the channel, the connection shown below will let you use any of the sound sources, A through C, that you would like.



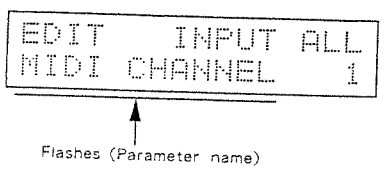
[e.g.] When MIDI performance messages are sent from the PM-16 on Channel 1, Sound Module A will play, and messages sent on Channel 2 will cause Sound Module B to play.

The channel through which performance information is communicated is called the MIDI Channel in this manual. In order to hear sound when you strike a pad, the MIDI Channel that sends PM-16 performance information (which can be set for each patch) and the sound source's MIDI Channel that receives that information, must be set to the same value. Make sure that the sending and receiving MIDI Channels are the same. If they are not, rectify this.

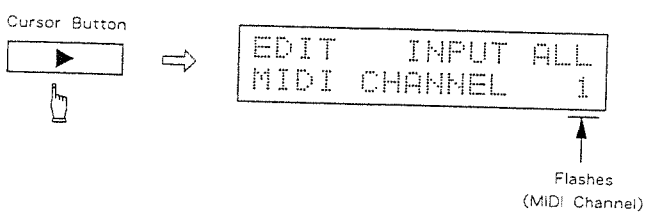
Do the following to change the PM-16's MIDI Channel :

[How to change the MIDI Channel]

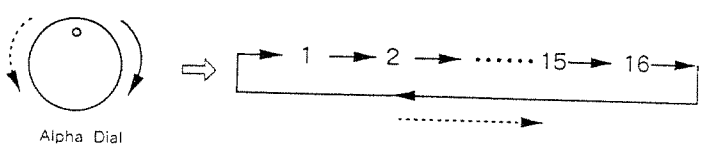
Step 1 Carry out "Calling the elements to be set" and then call MIDI CHANNEL.



Step 2 Press the Cursor Button to make the current MIDI Channel flash.



Step 3 Change the MIDI Channel by turning the Alpha Dial.



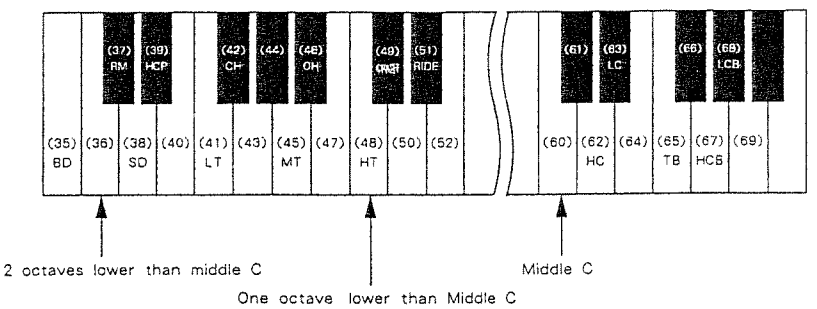
2) How each pad corresponds to a drum sound (Note Number)

The PM−16 has 16 different pad inputs. It converts information that it received through the inputs (which pad was struck and how strongly it was struck) into a different sort of information, which we call MIDI Note Information (Messages). The PM−16 then outputs this data.

There are two kinds of MIDI Note Information. One tells us, in terms of a keyboard, how strongly a particular key on the keyboard was struck. This is called Note On information. The other concerns how the key was released, and is called Note Off information. These two bits of information are the most important of all kinds of MIDI data. Numbers called Note−Numbers are assigned to the respective keys. These note numbers determine the range of each key.

In an ordinary rhythm machine, note numbers are assigned to each percussion sound that the machine has. With a PM−16, you can specify Note Numbers for each pad input. When using a rhythm machine as the sound source and a MIDI keyboard or another MIDI source, changing the Note Numbers changes the kind of percussion sounds heard.

The relationship between keyboard location and Note Numbers is shown below. The Note Number assignment for the percussion sounds of a rhythm machine depends on the machine. Here, we are taking the Roland TR−505 for our example. When making assignments with other models, read the instructions from the relevant manual.

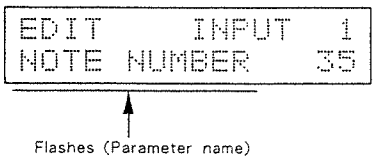


*The numbers in ( ) represents Note Numbers.

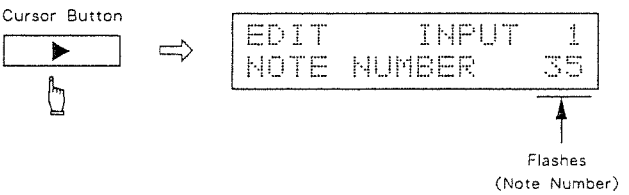
Do the following to change the PM−16's Note Numbers :

【How to change the Note Numbers】

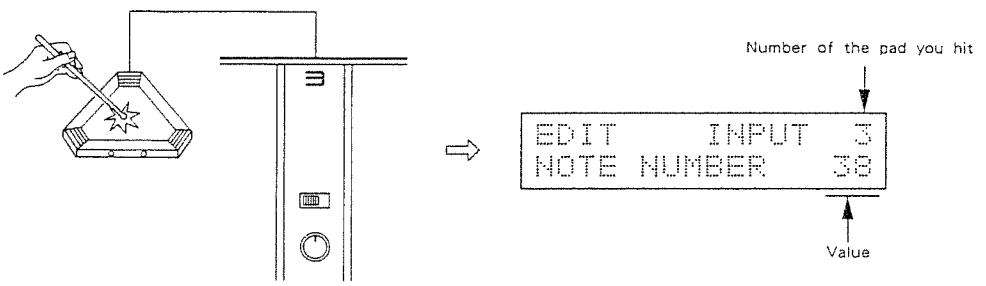
Step 1 Carry out "Calling the elements to be set" as explained on page 20 and then call NOTE NUMBER.



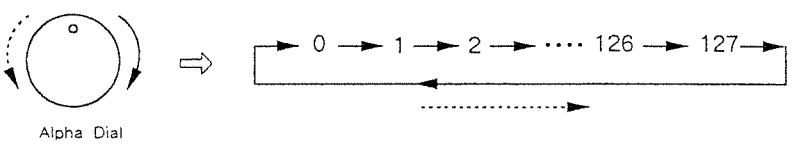
Step 2 Press the Cursor Button to make the current Note Numbers flash.



Step 3 Strike the pad whose Note Number you want to set. Striking the pad makes the pad's number, the number of the jack to which the pad is connected, and its current value appear in the Display.



Step 4 Change the Note Number by turning the Alpha Dial.

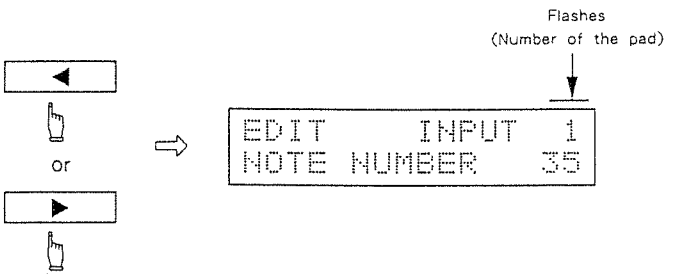


Step 5 Hit the pad and make sure that the sounds that correspond to the new Note Number come from the connected sound source.

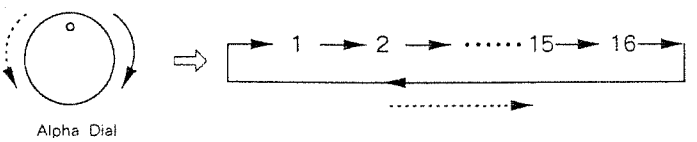
Step 6 Repeat Steps 3–5, if necessary.

In Step 3, we struck the pad to ascertain the pad's number. The following is an alternate method to carry out Step 3 :

①Press the Cursor Button to make the pad number flash.



②Turn the Alpha Dial to specify a new pad number.



3) Changing the tone of the connected source (Program Change)

With many MIDI keyboards and MIDI sound source modules, several kinds of tones can be memorized from which you can choose the one you would like to use. This change of tones can be done with an external MIDI device by specifying the numbers assigned to the respective tones. These numbers, called Program Change Numbers, use MIDI Program Change messages.

*The degree of correspondence between tones and Program Change Numbers varies from one device to another. Some devices are not capable of receiving a Program Change message. Read the relevant operation manual to learn of a device's correspondence capability.

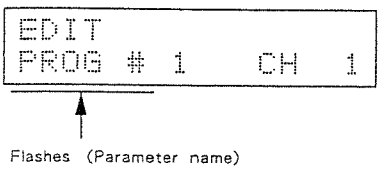
Only one Program Change Number can be sent to the source from the PM−16 when using a MIDI keyboard and/or a MIDI sound source module as the sound source for the PM−16. Changing patches automatically switches the tone from the one used with the previous patch to the new one used with the current patch.

The following procedure sets the Program Change Number, and the channel through which the number will be sent.

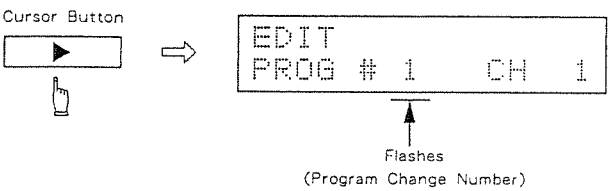
*In Basic Edit Mode, the channel through which a Program Change Number is sent must be the MIDI Channel set on p. 22.

【How to set a Program Change Number】

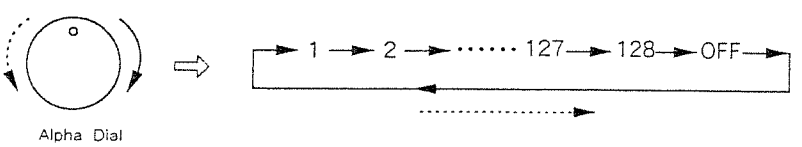
Step 1 Carry out "Calling the elements to be set" as explained on p. 20 and then call **PROGRAM CHANGE.**



Step 2 Press the **Cursor Button** to make the Program Change Number flash. If the Display says "OFF", make it flash.

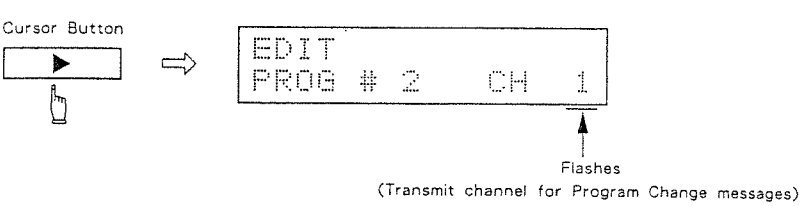


Step 3 Turn the **Alpha Dial** to set a new Program Change Number.

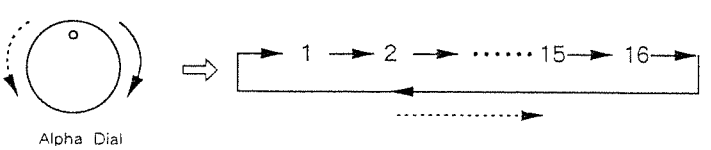


*If "OFF" is chosen as the setting, no Program change Number can be sent.

Step 4 Press the **Cursor button** to make the value of the channel through which the Program Change Number will be sent flash.



Step 5 Turn the **Alpha Dial** to set a transmit channel for Program Change.



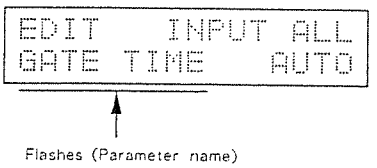
4) The length of time for which a sound is sustained (Gate Time)

With keyboard instruments like a MIDI keyboard, a key's sound will usually be sustained for as long as you hold the key down. (This is dependent upon the setting of the envelope, which controls the duration of the sound. At certain settings, sustaining the sound is impossible.) The length of time that a key is held down is referred to as the Gate Time. When using a MIDI Keyboard or another MIDI sound source module as your source, some tones require you to set the Gate Time. Especially, if you want a sound that rises slowly,the Gate Time should be set to a longer length of time.

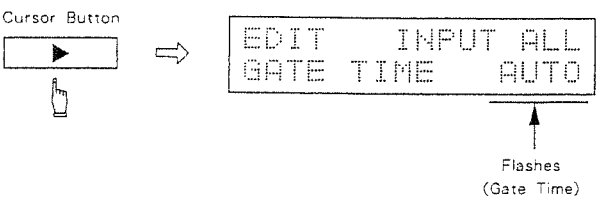
The following procedure sets the Gate Time

[How to set the Gate Time]

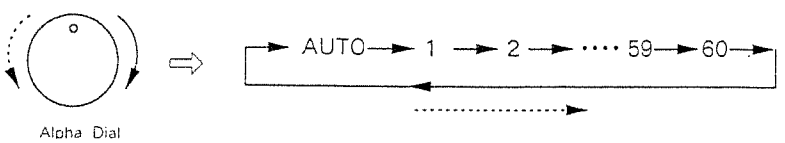
Step 1 Carry out "Calling the elements to be set" as explained on p. 20 and then call GATE TIME.



Step 2 Press the Cursor button to make the Gate Time value flash. If the Display says "AUTO", make it flash.



Step 3 Turn the Alpha Dial to set Gate Time.



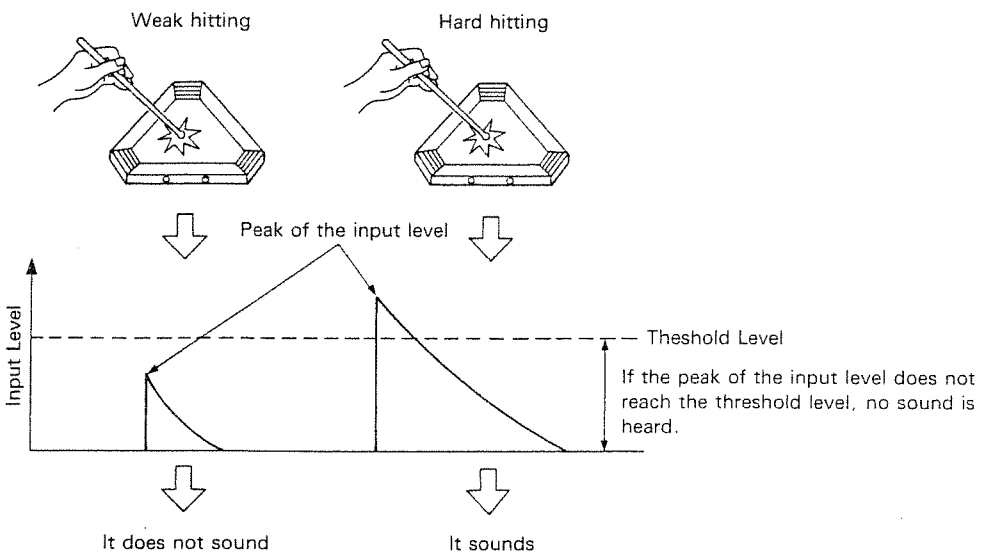
*When using a rhythm machine as your source, it is best usually to set the Gate Time to "AUTO".

Hit the pad and listen to the sounds emitted while setting the Gate Time.

5) Preventing malfunctions caused by surrounding noise or vibrations (Threshold)

Sometimes you will want to use microphones to pick up the sounds of acoustic drums, or other sounds, and then use these microphone signals as your input signal. This is instead of using pads (PD−11/21/31) which are made exclusively for the PM−16 However, if you do this, the microphones might pick up background noise and/or vibrations. The Threshold level has been incorporated into the unit to prevent this problem.

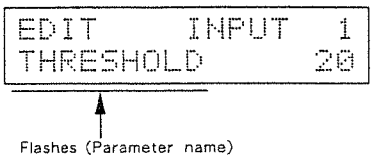
It takes some judgment to set the Threshold correctly. If the value is set too high, the source module will output only very strong input signals. When using pads, increase the Threshold setting if vibrations or noise cause the source module to sound. Set its value carefully ; if the value is too large, the sound of light drumbeats will not send a trigger to the sound source module.



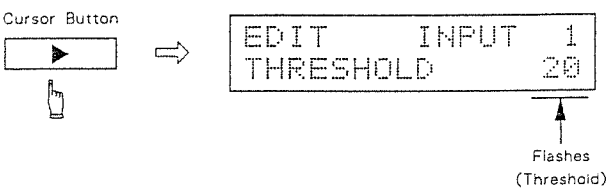
Do the following to set the PM−16's Threshold Value :

【How to set the Threshold】

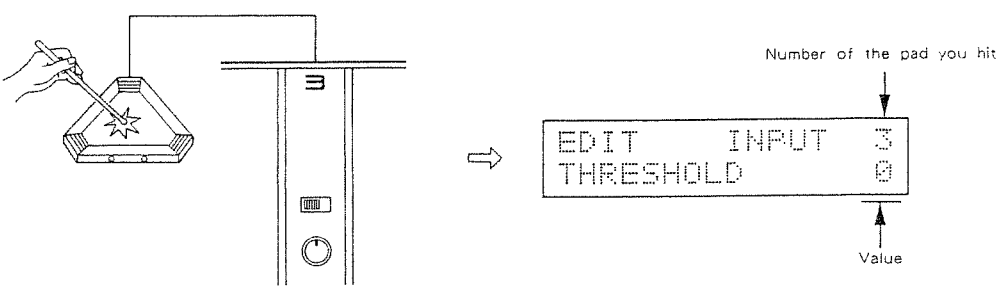
Step 1 Carry out "Calling the elements to be set" on p. 20 and then call THRESHOLD.



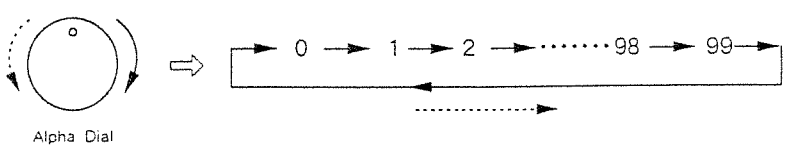
Step 2 Press the Cursor Button to make the current Threshold value flash.



Step 3 Strike the pad for which you would like to set the Threshold. Striking the pad makes the pad's number, the number of the jack to which the pad is connected, and its current value appear on the Display.



Step 4 Set the Threshold to an appropriate value by turning the Alpha Dial.



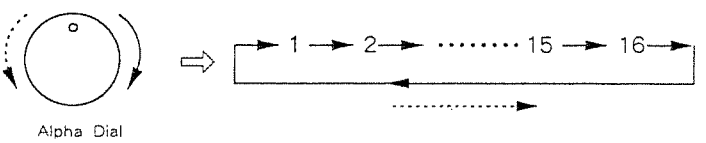
Make sure that sounds caused by striking the pad softly will still be emitted by the sound source module.
The Threshold value of Inputs 1 and 2 are preprogrammed at 20, and the other Inputs to zero. When using the PD-11, the Bass drum may sound twice by kicking it once. This can be quite often resolved by increasing the Treshold level.

Step 5 **Repeat Steps 3–4, if necessary.**

In Step 3, we struck the pad to ascertain the pad's number. The following is an alternate way to carry out Step 3

①Press the Cursor Button to make the pad number flash.

②Turn the Alpha Dial to specify a new pad number.



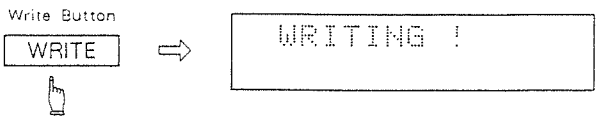
c. Keeping the contents of an edited patch in memory

The values that are specified by following the procedures of the previous section are only temporary. They will be erased, and then replaced by the original settings when you switch to the Play Mode, or turn the power off.

If you would like to keep the values that you have just set while editing, you must do the following immediately after editing to put them into memory.

Step 1 **Press the Write Button.**

The Display will change as below. The new values will now be stored in the patch.



***This operation erases the previous values stored in the patch before the most recent edit.**

d. Naming a patch

Each patch that you edit can also be given a name. This operation is called "naming".

As many as 32 characters can be used in a name. These will serve as a kind of memo that reminds you of the sound, the title of the tune, etc. The names you have given a patch appear in the Function Display when the PM−16 is in the Play Mode. Thus, at a glance, you will know what the patch is.

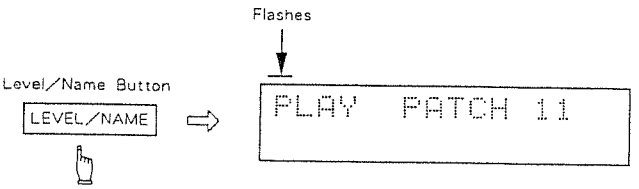
Follow the procedure below to name a patch.

【How to name a Patch】

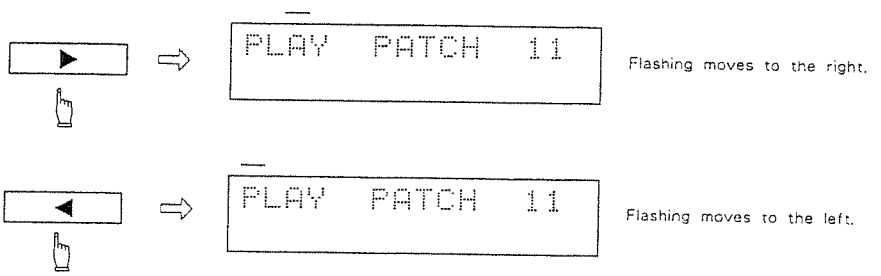
Step 1 Put the PM−16 in the EDIT or ADV mode.

Step 2 Press the Level/Name Button.

The first character (at the upper left) of the current name will flash, showing that it is ready to be changed.

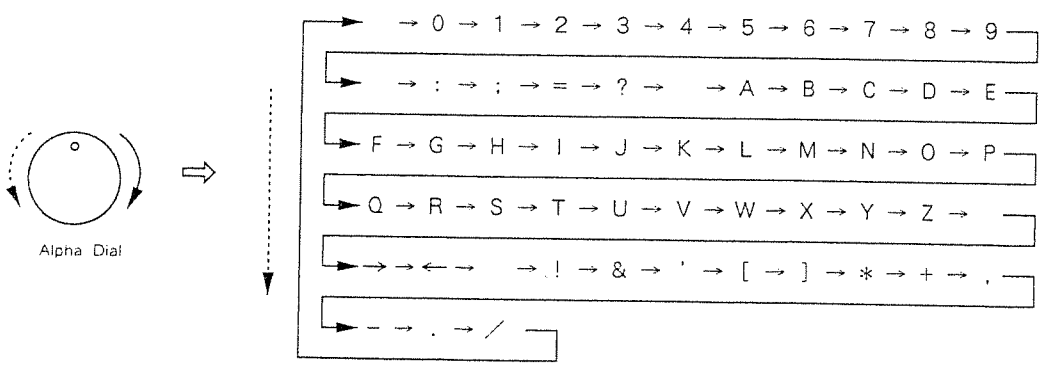


Step 3 Press the Cursor Button to make the character you would like to change flash.



Step 4 Change the character by turning the Alpha Dial.

The characters available are shown below. These characters will appear in the Display in this order as you turn the Dial.



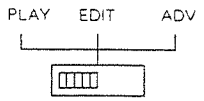
Step 5 Repeat Steps 3 and 4 as many times as necessary to finish naming.

*Names, once given in the way described above, remain in memory after turning the power off.

3. Play Mode

You must be in the Play Mode to perform with the patch you have edited or to change a Patch Number to edit another patch.

Simply setting the Mode Switch to PLAY puts the PM-16 in the Play Mode.

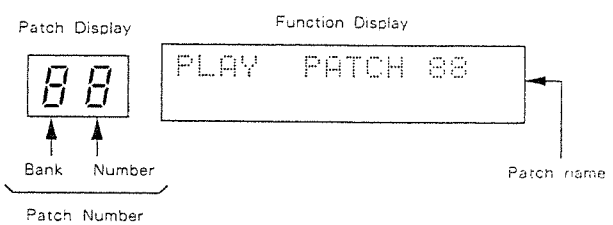


a. Changing the patch

There are 64 patches arranged in combinations of banks, numbered 1 to 8, and numbers, also numbered 1 to 8. See below. These combinations of a bank and a number are what we call Patch Numbers.

Patch Number		Number							
		1	2	3	4	5	6	7	8
Bank	1	11	12	13	14	15	16	17	18
	2	21	22	23	24	25	26	27	28
	3	31	32	33	34	35	36	37	38
	4	41	42	43	44	45	46	47	48
	5	51	52	53	54	55	56	57	58
	6	61	62	63	64	65	66	67	68
	7	71	72	73	74	75	76	77	78
	8	81	82	83	84	85	86	87	88

The Patch Display will display the patch number of the current patch while at the same time the Function Display will display its name.



To change Patch Numbers, and hence to change patches, do the following :

【How to change patches】

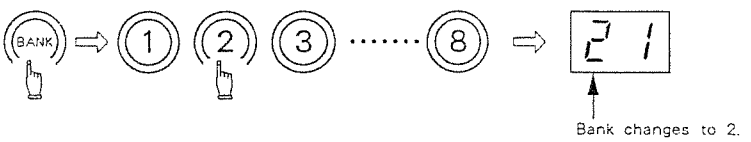
Changing the bank

Step 1 Press the bank button.

Step 2 Press a number button.

The Bank Display on the left side of the Patch Display will change to the number you press.

[e.g.]

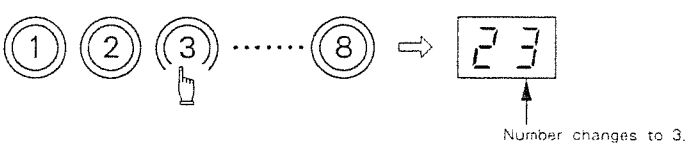


Changing the number

Step 1 Press a number button.

The Number Display on the right side of the Patch Display will change to the number you press.

[e.g.]

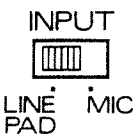


b. Adjusting the input level

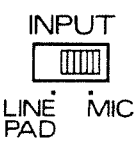
The main unit's Input Level Switch and Sensitivity Knob are for adjusting the level input from pads or microphones.

● **Input Level Switch**

Set this switch to the left to receive signals from pads or lines (connected to audio equipment).

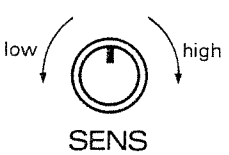


Set this switch to the right to receive signals from microphones.



● **Sensitivity Knob**

Turn this knob to the right to input a higher level, and to the left for a smaller level.



The input level value can be displayed in the Function Display by doing the following operation. This is useful when you would like to adjust the level input from each pad precisely.

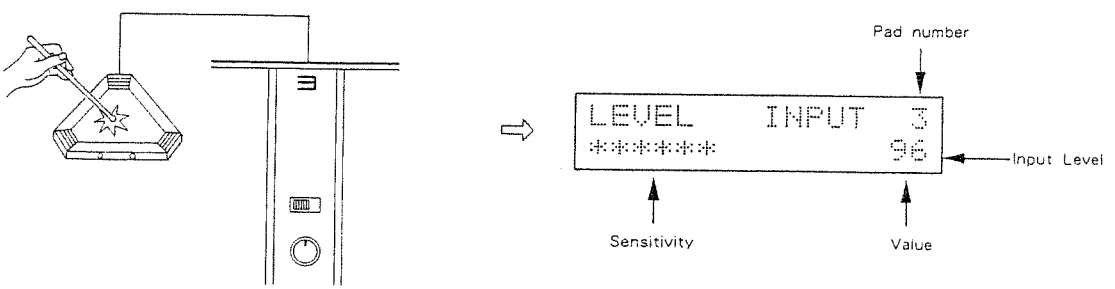
【How to adjust the input level】

Step 1 Put the PM−16 in the Play Mode.

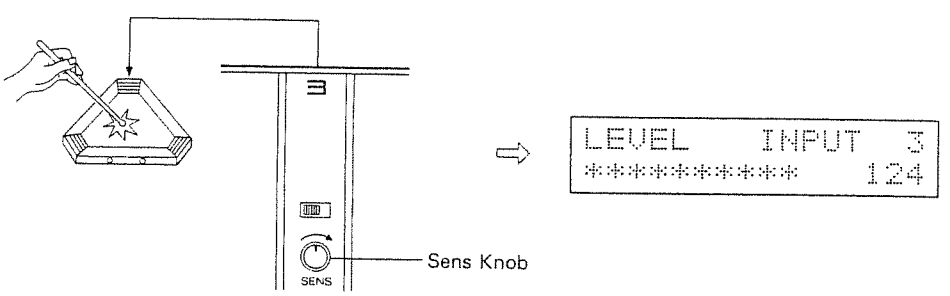
Step 2 Set the Sensitivity Knob to the 9 o'clock position.

Step 3 Press the Level/Name Button.

Step 4 Strike the pad whose input level you would like to adjust. The number of the pad that you are striking will appear in the upper right corner of the Function Display. The input level (1−126) of the pad will appear in the lower part of the Display.



Step 5 Slowly turn the Sensitivity Knob clockwise, so that the strongest hitting of a pad will make the input level display between 110 and 125.



Step 6 After adjusting the input levels for all the pads, press the Level/Name Button again.

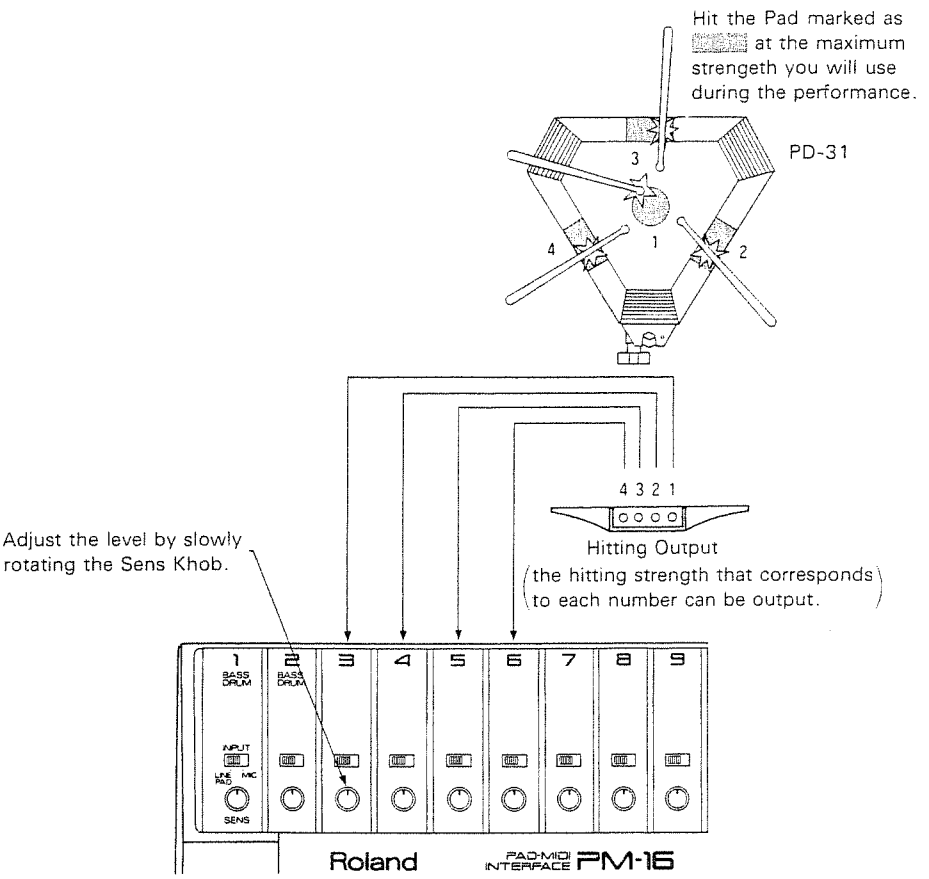
The PM−16 will return to the Play Mode.

■ Adjusting the input level when using the PD-31

When using the PD-31, which is a pad made exclusively for the PM-16, and whose three rims and central face all can send signals to the main unit, be sure to adjust all four inputs (the three rims and the face) as explained on page 36.

When striking one of the rims or the central face of the PD-31, mechanical vibration could generate sounds in a part that you are not striking, because of interference between the face and the rims.

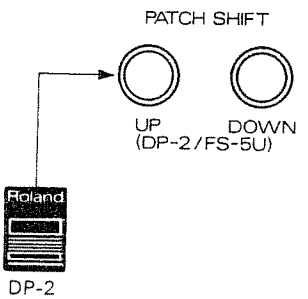
Carefully match the input levels for the face to the rims. This will reduce noises of this kind to a minimum.

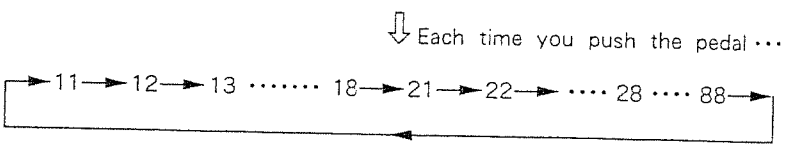


c. Changing patches with pedal switches

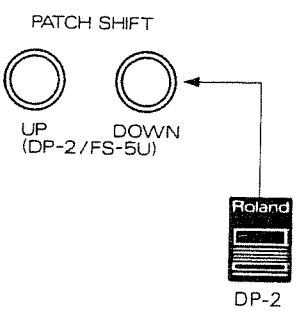
With the optional pedal switches (DP-2, BOSS FS-5U, etc.) connected to the Patch Shift Jack, patches can be changed by simply stepping on the pedal.

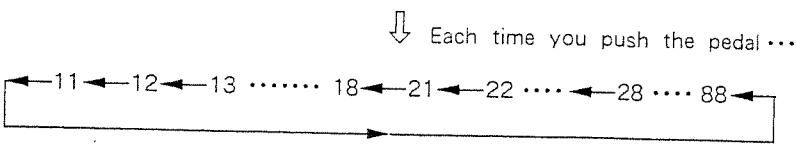
Each time that you step on the pedal switch connected to the UP Patch Shift Jack, the Patch Number will increase by one.





Each time that you step on the pedal connected to the DOWN patch shift jack will make the Patch Number decrease by one.





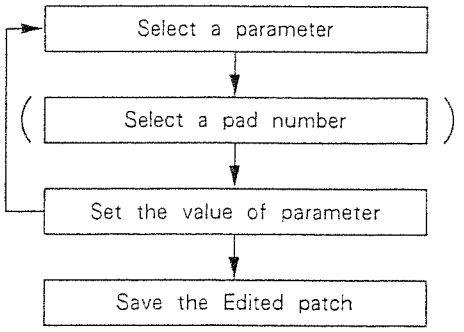
Holding your foot down on the pedal will make the patch change at regular intervals.

4 OPERATION II (Advanced)

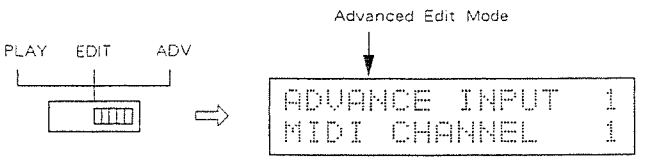
1. Advanced Edit Mode

In the Advanced Edit Mode, you are able to use more diversified elements than those required to simply make sounds. This mode lets you assign a different MIDI sound source to each pad, bend the pitch of a sound source, make several sounds by hitting a single pad, and so on. With this mode, you can give a more varied performance.

The actual editing operation in this mode is basically the same as that in the Basic Edit Mode. The difference is that all of the elements, excepting Program Change, can be set differently for each pad. This means that you need to choose the Pad Number before setting each element, in the same way that you set NOTE NUMBERS in the Basic Edit Mode.



Setting the Mode Switch to ADV puts the PM-16 in Advanced Edit Mode.



a. Calling the elements to be set

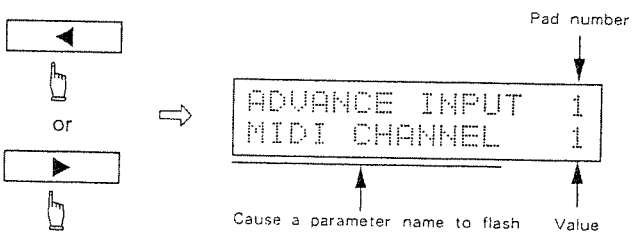
You can only edit five elements (parameters) in the Basic Edit Mode. In the Advanced Edit Mode, you can edit all thirteen elements listed in the table below. (All of them, except for Program Change, can be set differently, pad by pad.)

Parameter	Variable Range
MIDI Channel	1–16
Note Number	0–127
Program Change	
MIDI Channel	1–16
Number	1–128, OFF
Gate Time	AUTO, 1–60
Threshold	0–99
Dynamic Curve	1–5
Dynamics Pitch	–24–OFF–+24
Bend Depth	–60–OFF–+60
Bend Decay	1–99
Dynamics Bend	ON/OFF
Minimum Velocity	OFF, 0–99
Layer	OFF, 1–16
Retrigger Limit Time	0–60

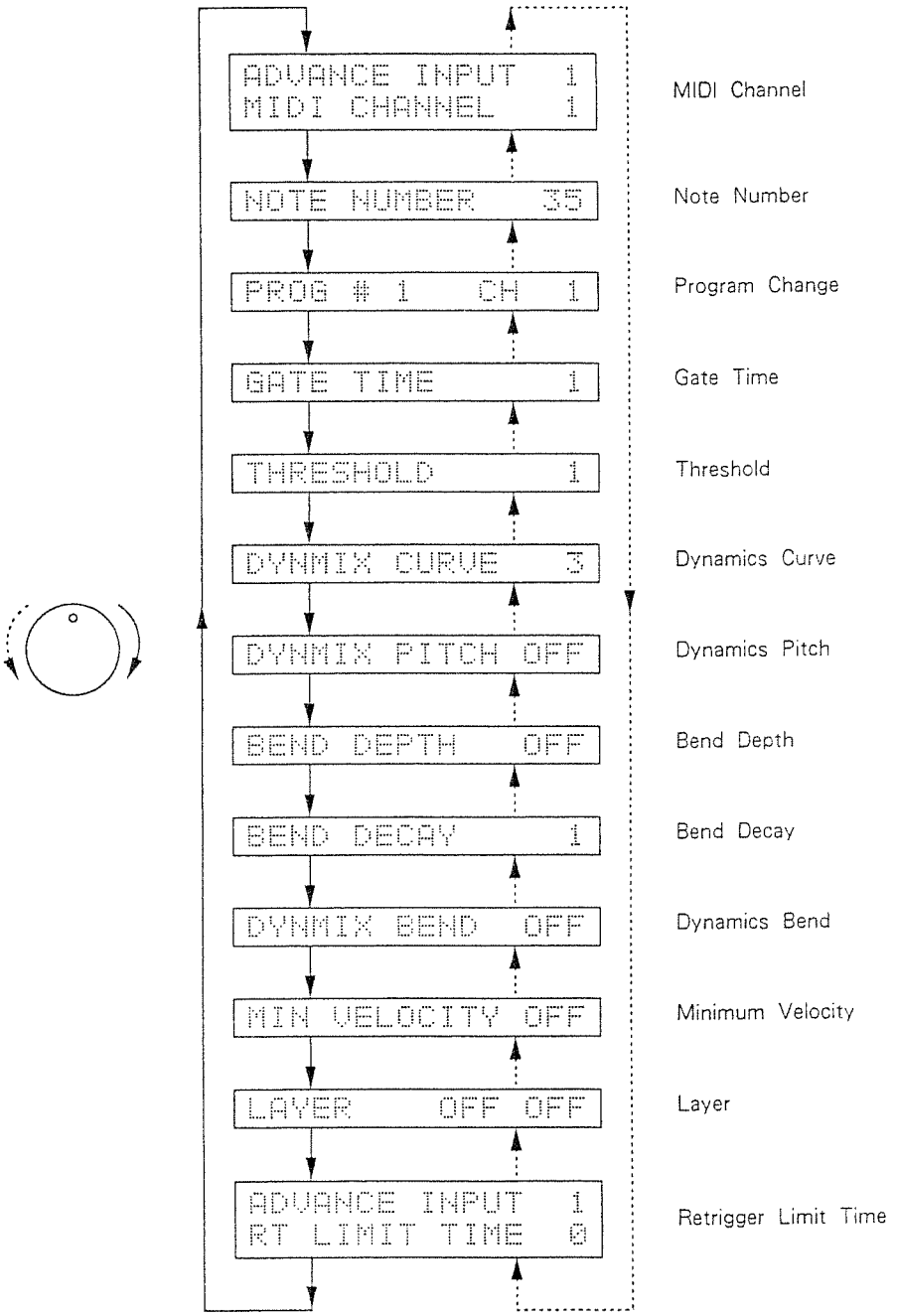
The operation below will allow you to call each respective element and check the value to which it is currently set.

Step 1 **Make sure the PM–16 is in the Advanced Edit Mode.**

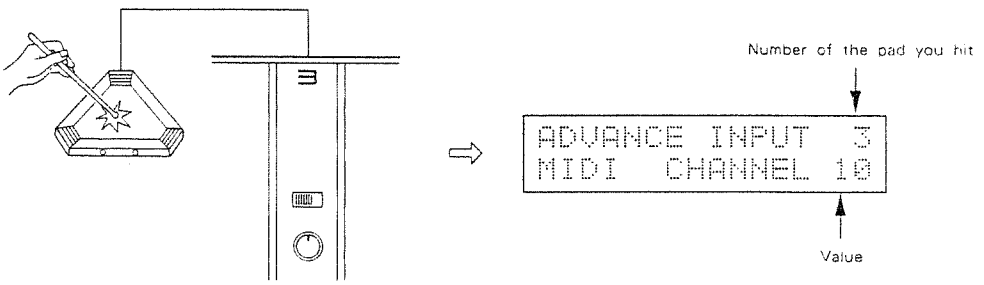
Step 2 **If the element name is not flashing, press the Cursor Button to make it flash.**



Step 3 Turn the Alpha Dial. The thirteen element names and the values to which they are currently set will appear in turn in the Display.

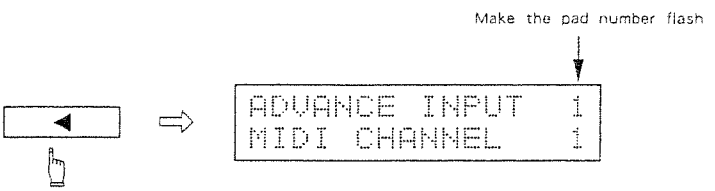


Step 4 In order to have the values set for another pad displayed, strike that pad. Striking the pad makes the pad's number and values appear in the Display.



You can display the values for a different pad without actually hitting it, by following the procedure below instead of Step 4, above.

①Press the Cursor Button to make the pad number flash.



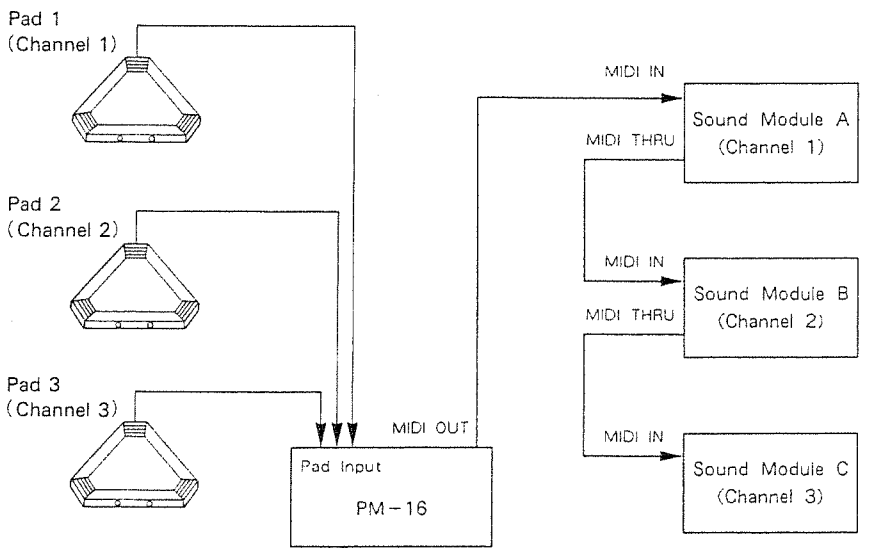
②Turn the Alpha Dial. The pad numbers and their values will appear for each pad in turn.

b. The function and setting of each element

Setting NOTE NUMBER, PROGRAM CHANGE, and THRESHOLD is done in exactly the same manner as explained above for the Basic Edit Mode.

1) Assigning a different MIDI sound source to each pad.

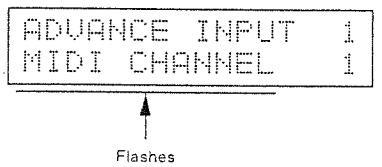
In the Advanced Edit Mode, MIDI sound sources can be assigned, pad by pad. You can assign a different MIDI sound source to each pad by assigning a different channel to the MIDI Channel of each pad.



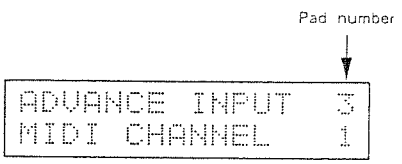
Hitting Pad 1 plays Sound Module A, Pad 2 plays Sound Module B, and Pad 3 plays Sound Module C.

【How to set the MIDI Channel for each pad】

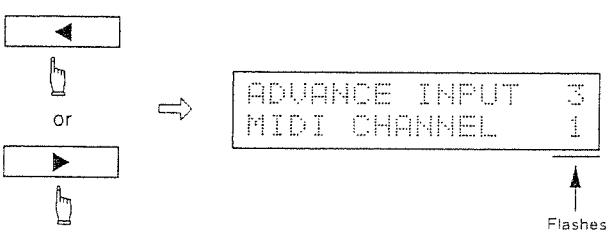
Step 1 Carry out Steps 1–3 of "Calling the elements to be set" as explained on p. 40 and then call MIDI CHANNEL.



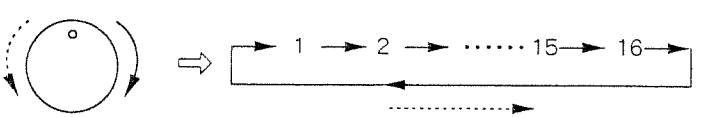
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify for which pad you would like to set the MIDI Channel.



Step 3 Press the Cursor Button to make the current value of the MIDI Channel flash.



Step 4 Change the MIDI Channel by turning the Alpha Dial.



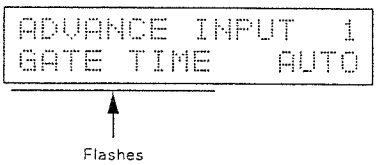
Step 5 Repeat Steps 2–4 if necessary.

2) Setting a different Gate Time for each pad

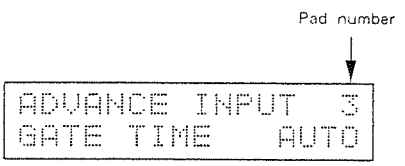
Please read p. 27 to learn about the basic functions of Gate Time. The same Gate Time is set for all the pads in the Basic Edit Mode. In the Advanced Edit Mode, a different Gate Time can be set for each pad.

[How to set the Gate Time for each pad]

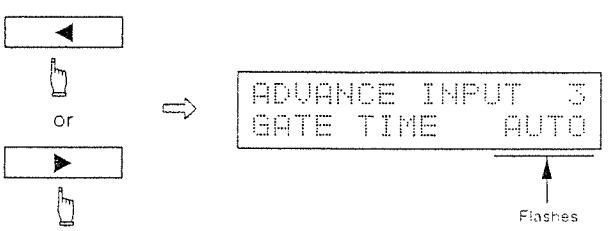
Step 1 — Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call GATE TIME.



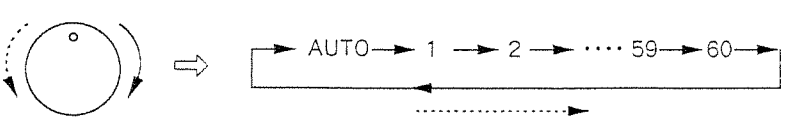
Step 2 — Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify which pad you would like to set the Gate Time for.



Step 3 — Press the Cursor Button to make the current Gate Time value flash.



Step 4 — Set the Gate Time by turning the Alpha Dial.



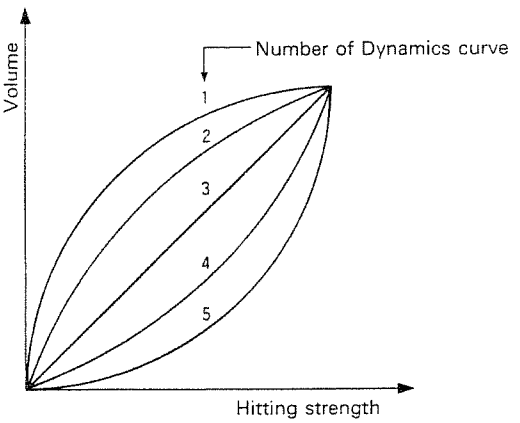
While setting the Gate Time, hit the pad and listen to the sounds being emitted from the sound source.

Step 5 — Repeat Steps 2–4 if necessary.

3) Changing how the sound source volume responds to the force with which a pad is struck (Dynamics Curve)

Naturally, the harder you strike a pad, the louder the sound created, and the softer, the quieter. With the PM−16, however, you can alter the way that the sound volume responds to the intensity with which you strike a pad.

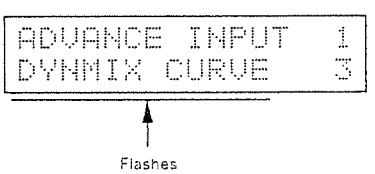
There are five ways available for the volume of the sound to respond to the intensity that a pad is struck. These are illustrated below by curves that we call Dynamics Curves.



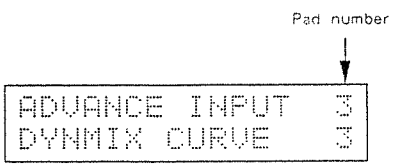
***Some MIDI sound source devices have similar functions, such as dynamics curves or dynamics sensitivity. Using these devices with the PM−16 can alter the dynamics curve of the PM−16. Choosing the correct curve from these five then depends on which device is being used with the PM−16.**

【How to set the Dynamics Curve】

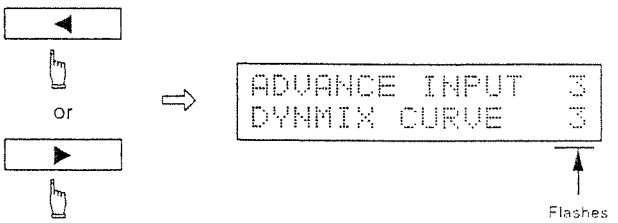
Step 1 Carry out Steps 1−3 of "Calling the elements to be set" as explained on p. 40 and then call DYNAMICS CURVE.



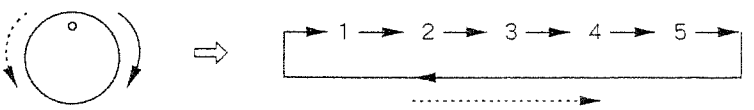
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad for which you would like to specify a Dynamics Curve.



Step 3 Press the Cursor Button to make the number of the current Dynamics Curve flash.



Step 4 Turn the Alpha Dial to choose the Dynamics Curve number you would like.



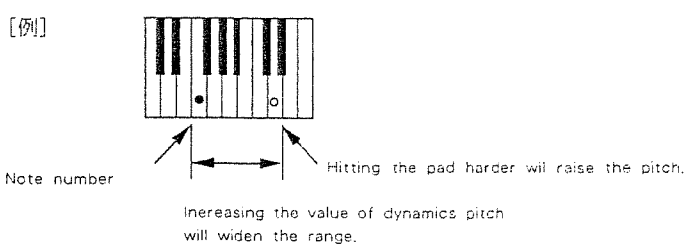
Hit the pad with varying intensities, and listen to the sounds being emitted from the sound source when you choose a Dynamics Curve.

Step 5 Repeat Steps 2–4 if necessary.

4) Changing the pitch by the intensity of each drum-beat (Dynamics pitch)

The pitch of an emitted sound can be changed by the intensity with which a pad is hit when a MIDI keyboard, a MIDI sound source module, and/or a sampler are used as sound sources. This function is referred as Dynamics Pitch. A MIDI keyboard or a similar device can, when used as a sound source, have the pitch of the sounds that will be emitted from it set by setting the Note Number, etc.. With this function and the Note Number values, the note number sent to the sound source changes according to how forcibly you hit the pad. Thus the pitch of the sounds from the source are malleable in this fashion. A larger Dynamics Pitch value enlarges the Note Number variation range (the range within which the pitch can vary).

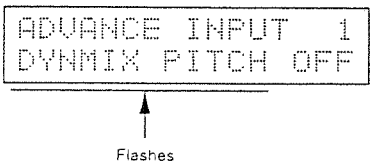
[例]



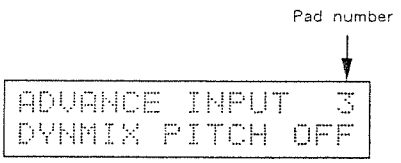
When a rhythm machine is used as the sound source, using the Dynamics Pitch, allows you to change the type of percussion sounds heard according to how forcibly the pad is hit.

[How to set the Dynamics Pitch]

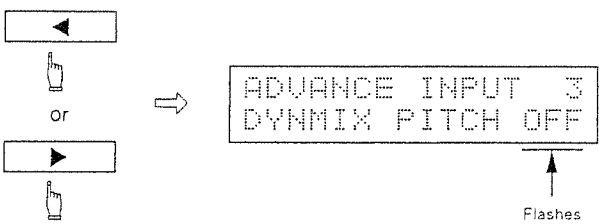
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call DYNAMICS PITCH.



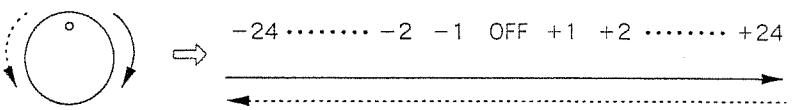
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad for which you would like to specify the dynamics pitch.



Step 3 Press the Cursor Button to make the current Dynamics Pitch value flash.



Step 4 Turn the Alpha Dial to set the Dynamics Pitch value you would like. Setting the Dynamics Pitch to a positive value raises the pitch. Setting it to a negative value deepens the pitch. The larger the absolute value is, the larger the pitch change will be. Setting it to OFF disconnects this function.



Hit the pad with varying intensities and listen to the sounds being emitted from the sound source while you are setting the Dynamics Pitch.

Step 5 Repeat Steps 2–4 if necessary.

5) Adding pitch bend to the sounds (Bend Depth, Bend Decay, Dynamics Bend)

The pitch bend function changes the pitch smoothly or continuously over time in the same way that the pitch bender functions for a MIDI keyboard. This function permits you to have some interesting effects when using a MIDI keyboard, a MIDI sound source module, a sampler, or other devices as sound sources.

When playing a MIDI keyboard the pitch bender function can be operated manually with a lever during your performance. With the PM−16, you set the pitch variation range beforehand. Striking the pad will create a sound at a pitch obtained by adding the pitch bend variation to the set Note Number. Then the sound gradually returns to the pitch set by the Note Number. There are three elements which need to be set in order to create this pitch bend effect.

● Bend Depth

This is the variation of the pitch (or the depth of pitch bend).

● Bend Decay

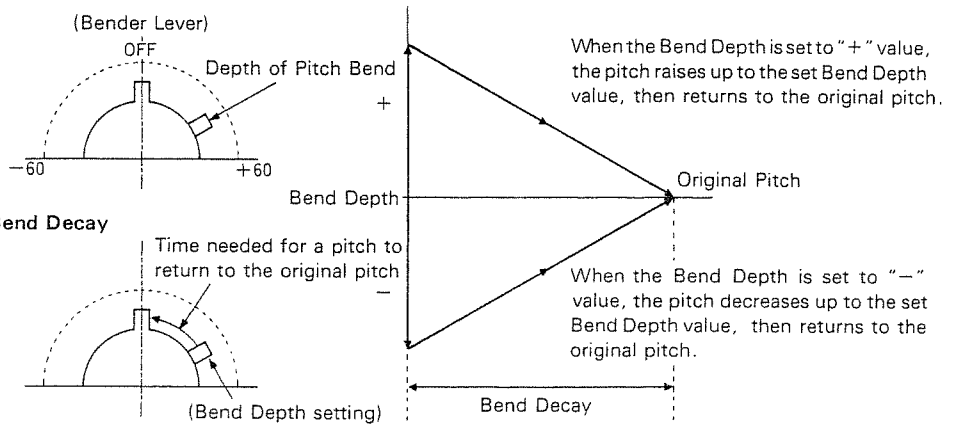
This is the length from the beginning of pitch bend effect until the sound resumes its regular pitch.

● Dynamics Bend

With this element turned ON, you can change the depth of the pitch bend effect by changing the intensity with which you strike the pad. The maximum depth is the value that you set for Bend Depth.

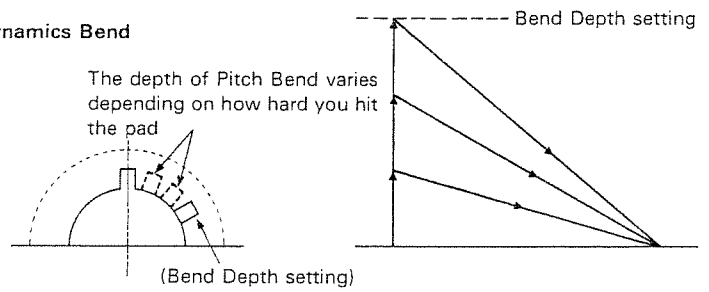
The figure shown on the following page explaines these three elements in conjunction with a moving Bender Lever.

Bend Depth



Bend Decay

Dynamics Bend

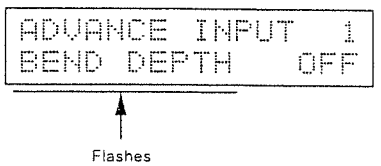


* A single MIDI Channel can only handle one pitch bend signal at a time. If two or more pads are connected to the same MIDI channel, the pitch bend setting of the last pad struck takes effect.

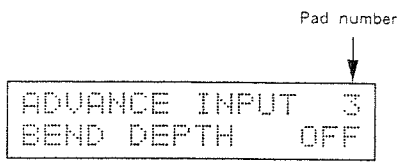
* If the sound source has no pitch bend capability, or it is set to block bend messages, then there will be no pitch bend effect.

【How to set the Bend Depth】

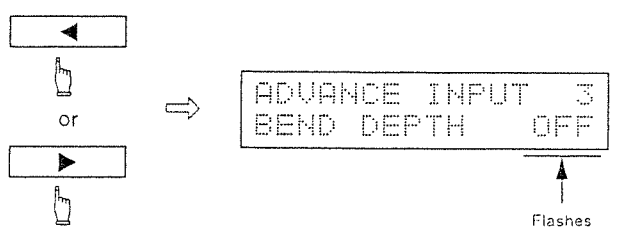
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call BEND DEPTH.



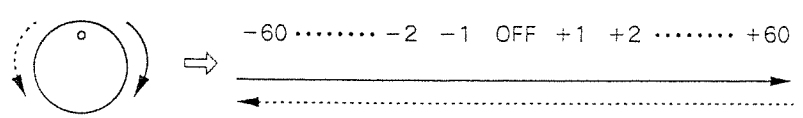
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad for which you would like to set the Bend Depth.



Step 3 Press the Cursor Button to make the current Bend Depth value flash.



Step 4 Turn the Alpha Dial to set the Bend Depth to the value that you would like. Setting the Bend Depth to a positive value raises the pitch the moment you strike the pad. Setting it to a negative value lowers the pitch. The larger the value of the Bend Depth is, the larger the variation becomes. If it is set to +60 or −60, the effect will be the same as when the Bender Lever is pushed to its limit. Setting it to OFF disconnects this function.

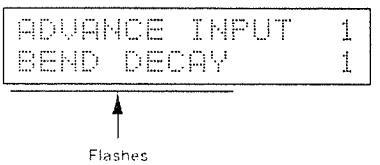


Hit the pad and listen to the sounds being emitted from the sound source while you are setting the value of the Bend Depth.

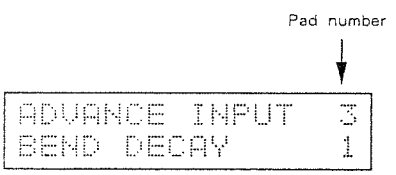
*If there is another pad connected to the same MIDI channel, the pitch bend effect might take effect on the sounds coming from the second pad, even if the second pad's Bend Depth is set to OFF.

【How to set the Bend Decay】

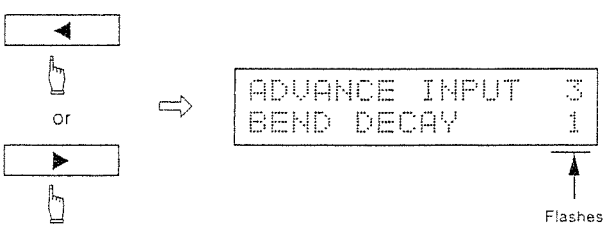
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call BEND DECAY.



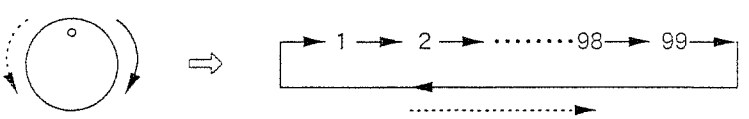
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad for which you would like to set the Bend Decay.



Step 3 Press the Cursor Button to make the current Bend Decay value flash.



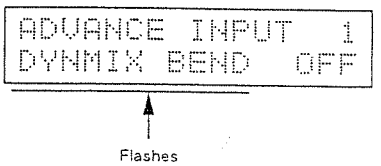
Step 4 Turn the Alpha Dial to set the Bend Decay to the value that you would like. The greater the value you set, the longer it will take for the sound to resume its regular pitch.



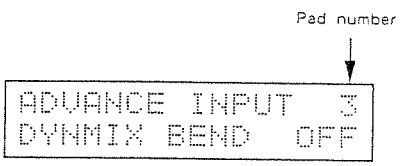
Hit the pad and listen to the sounds being emitted from the sound source while you are setting the value of the Bend Decay.

[How to set the Dynamics Bend]

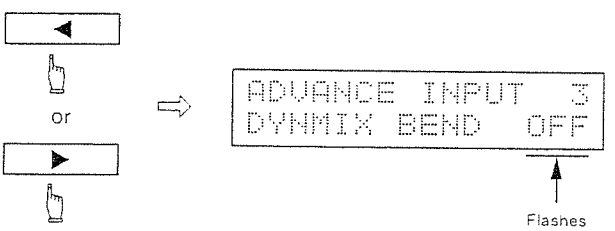
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call DYNAMICS BEND.



Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad for which you would like to set the Dynamics Bend.

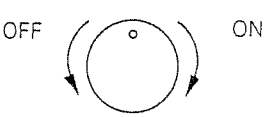


Step 3 Press the Cursor Button to make the current Dynamics Bend value flash.



Step 4 Turn the Alpha Dial to choose ON or OFF. If it is set to ON, the Dynamics Bend effect will happen, which means that the pitch bend depth will change according to how you strike the pad.

If it is set to OFF, then there will be no effect.



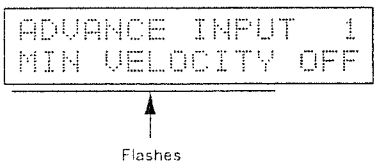
6) Changing the Minimum Volume (Minimum Velocity)

This function, called the Minimum Velocity, lets you set the minimum sound volume.

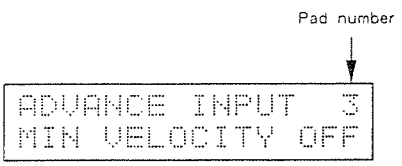
Use this function when you would like to have a certain volume level no matter how weakly you strike the pad.

【How to set the Minimum Velocity】

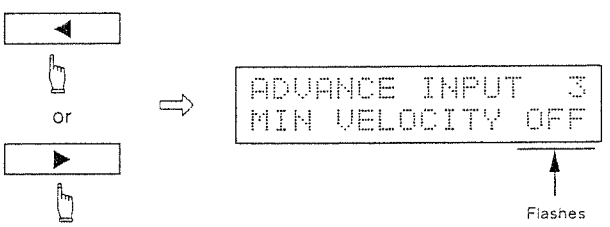
Step 1 Carry out steps 1–3 of "Choosing the elements to be set" as explained on p. 40 and then call MINIMUM VELOCITY.



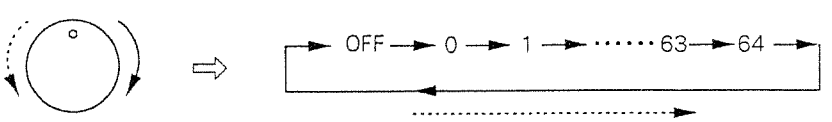
Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad whose Minimum Velocity you would like to set.



Step 3 Press the Cursor Button to make the current value of the Minimum Velocity flash.



Step 4 Turn the Alpha Dial to set the Minimum Velocity to the value that you would like.



Hit the pad softly and make sure that you hear the volume you want to hear while you are setting the value of Minimum Velocity.

7) Making two or more kinds of sounds while hitting one pad (Layer)

In the Advanced Edit Mode, every element except Program Change can be set differently for each pad. You can also assign two or three different element settings to a single pad. It is possible to use a setting already assigned to another pad. This lets you make two or three different kinds of sounds with a single pad. This function is called Layering.

For example, when using a MIDI keyboard or a MIDI sound source module, assigning three settings with three different Note Numbers to a single pad lets you make a chord by striking a single pad.

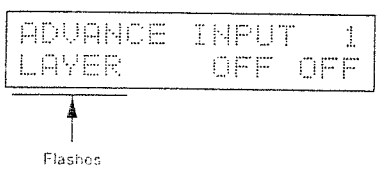
Additionally, when using a rhythm machine or a sampler for your source, using two settings with different Note Numbers and Dynamics Curves enables you to change the volumes of the two kinds of sounds by changing the intensity with which you hit the pad.

There are many other ways to use this function besides these two. Experiment with it and find your own applications.

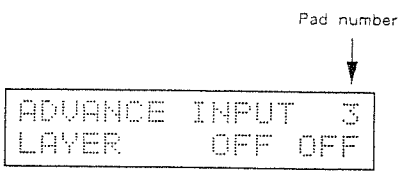
*Please note that not all of the elements will work within the Layer function. Program Change, Threshold, and Layer itself cannot be layered.

[How to set the Layer Function]

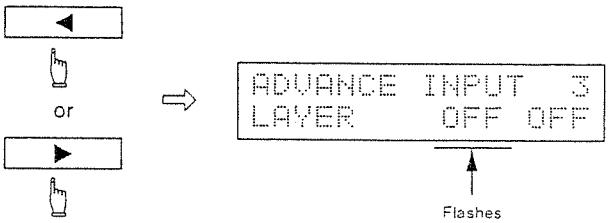
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call LAYER.



Step 2 Do Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the pad whose Layer you would like to set.

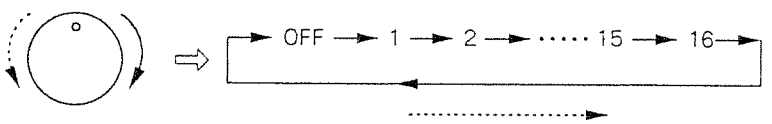


Step 3 Press the Cursor Button to make the first (left side) Layer setting flash.

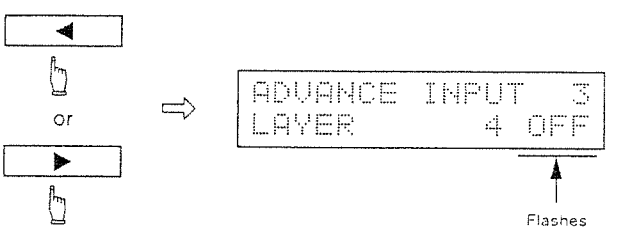


Step 4 Turn the Alpha Dial to choose the Pad Input Number you would like to use.

If you do not wish to use Layer, set it to OFF.

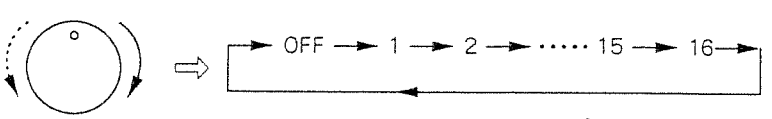


Step 5 Press the Cursor Button to make the second (right side) Layer setting flash.



Step 6 Turn the Alpha Dial to choose the Pad Input Number you would like to use.

If you do not wish to use Layer at all, or only wish to use the first one, set it to OFF.



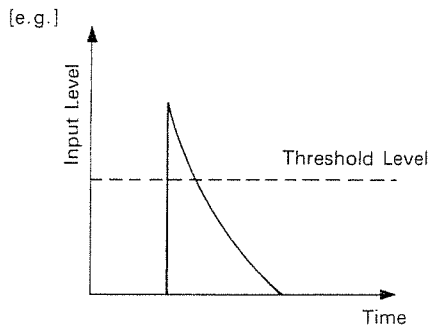
8) Using acoustic sounds to trigger a sound source (Retrigger Limit Time)

Sometimes you will want to input an acoustic drum signal. In this case, you will connect microphones to pick up the acoustic drum signals and then use these signals to trigger your sound source. Unfortunately, these acoustically generated signals, which we call trigger signals, sometimes create an echo because the waveforms of acoustic drum signals are more complex than those of pad signals.

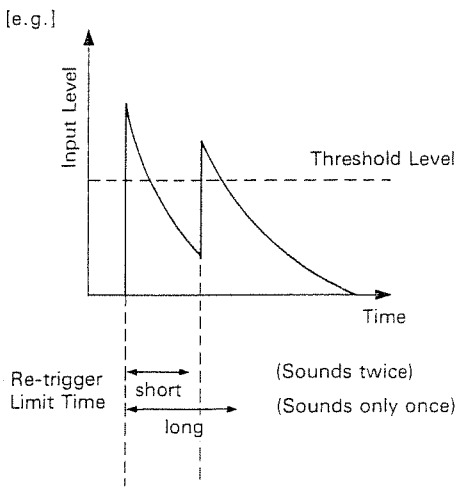
As shown below, acoustic drum or percussion signals sometimes return to a high level a second time after being struck. If this second higher level is greater than the set Threshold level (See p. 28) there will be an echo.

To prevent this kind of malfunction, the PM−16 is equipped with a function called the Retrigger Limit. The Retrigger Limit prohibits the acceptance of an input signal for a certain period of time from the moment a signal higher than the set threshold is input. This time period, during which no input signal is accepted, is called the Retrigger Limit Time. By setting this time period properly, you can prevent the sound source from emitting an echo.

Trigger signal of the pad for an electronic drum



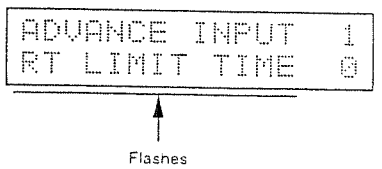
Trigger signal created by an acoustic drums



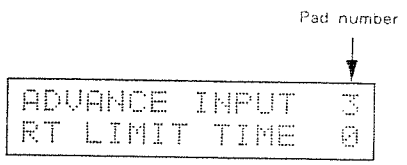
* When you pick up acoustic drum or percussion sounds with microphones, and want to input these signals into the PM− 16, set the Input Level Switch to MIC.
Additionally, set the Threshold (See p. 28) to the best value possible to prevent interference from other drum sounds that also can make the sound source emit unwanted sounds.

【How to set the Retrigger Limit Time 】

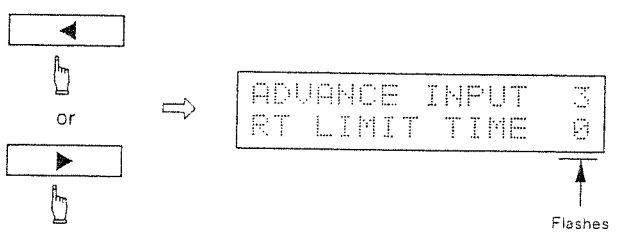
Step 1 Carry out Steps 1– 3 of "Calling the elements to be set" as explained on p. 40 and then call RETRIGGER LIMIT TIME.



Step 2 Following a procedure similar to Step 4 of "Calling the elements to be set" as explained on p. 40 to specify the tom tom or other instrument (Pad Input Number) for which you would like to set the Retrigger Limit Time.

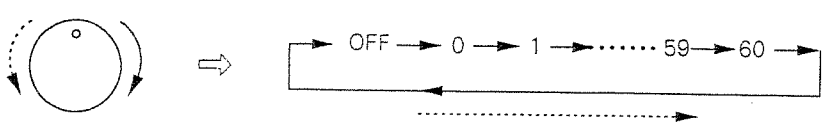


Step 3 Press the Cursor Button to make the current Retrigger Limit Time value flash.



Step 4 Turn the Alpha Dial to set the Retrigger Limit Time.

*The larger the value you set, the longer the time through which the input signals will be refused. If you set a value that is too large, the sound source will not work when you hit the instrument repeatedly.



Hit the tom tom, or any other instrument that you have chosen and listen to the sound being emitted by the sound source while you are setting the Retrigger Limit Time.

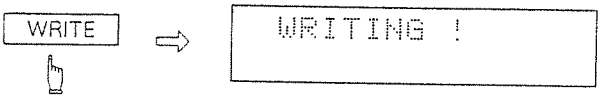
c. Keeping the contents of an edited patch in memory

The values that are specified by following the procedures of the previous section are only temporary. They will be erased and then replaced by the original settings when you switch to the Play Mode or turn the power off.

If you would like to keep in memory the values that you have just set while editing you must do the following, immediately after editing.

Step 1 **Press the Write Button.**

The Display will change as below. The new values will now be stored in the patch.



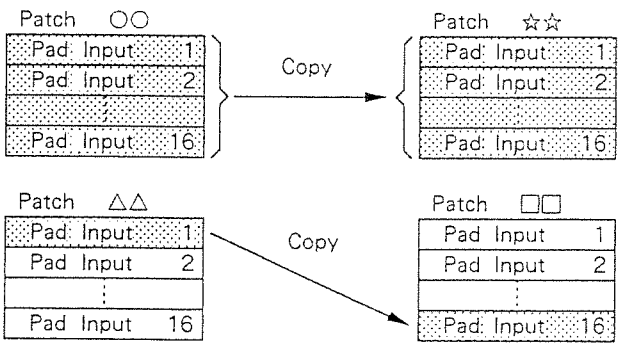
*This operation erases the previous values stored in the patch before the most recent edit.

2. Functions useful for editing a patch

a. Copy

Sometimes you will want to make a patch that will be very similar to one that you already have. In this case, you can save a lot of labor by copying the older patch and then changing only the settings that you want to differ from the original. Similarly, if a pad input setting that you would like to make has a lot in common with an already existing one in the patch, copying the older setting will leave only a little work for you to do. You only need to set the parts of the new input setting that will not be the same as the older one.

The PM−16 has two copy functions, that allow you to do either of these operations efficiently.

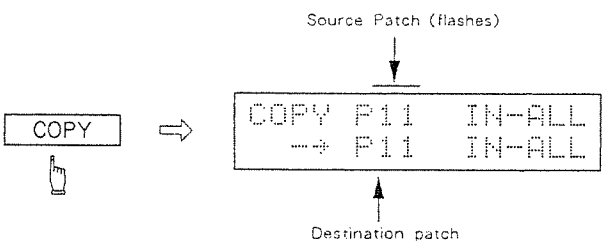


1) Copying the contents of one patch into another

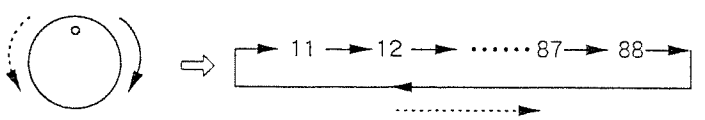
Step 1 Put the PM−16 into the Basic Edit or Advanced Edit Mode.

Step 2 Press the Copy Button.

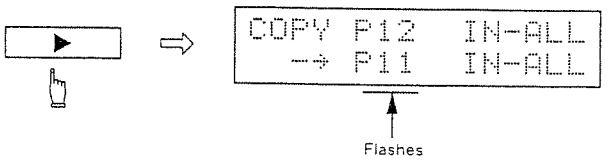
The Display will change as shown below. The Patch Number of the patch that you would like to copy FROM, will start to flash.



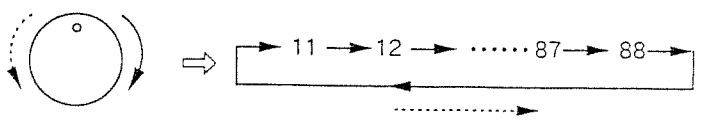
Step 3 Choose the Patch Number of the patch that you would like to copy FROM by turning the Alpha Dial.



Step 4 Press the Cursor Button to make the Patch Number of the patch that you would like to copy TO flash.

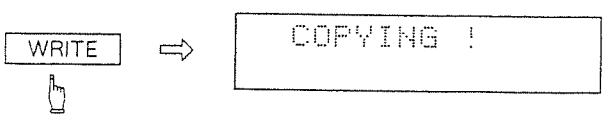


Step 5 Choose the Patch Number of the patch that you would like to copy the original patch INTO by turning the Alpha Dial.



Step 6 Press the Write Button.

The Display will display the following while copying is in progress.



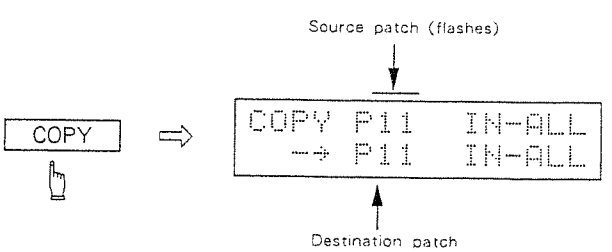
Step 7 Press the Copy Button to return the Display to normal.

2) Copying the contents of one pad to another

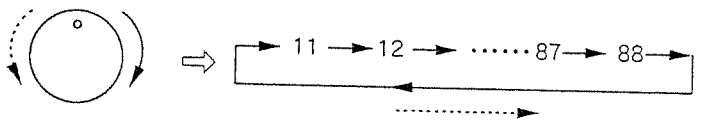
Step 1 Put the PM–16 into the Basic Edit or Advanced Edit Mode.

Step 2 Press the Copy Button.

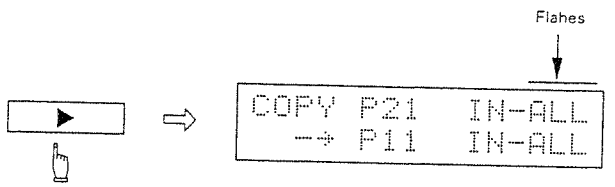
The Display will change as shown below. The Patch Number of the patch that you would like to copy FROM will start to flash.



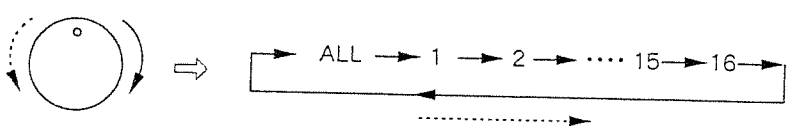
Step 3 Choose the Patch Number of the patch that you would like to copy FROM by turning the Alpha Dial.



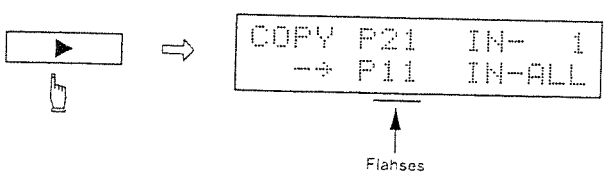
Step 4 Press the Cursor Button to make the Pad Input Number flash.



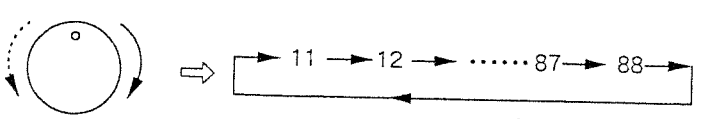
Step 5 Choose the Pad Input Number that you would like to copy FROM by turning the Alpha Dial.



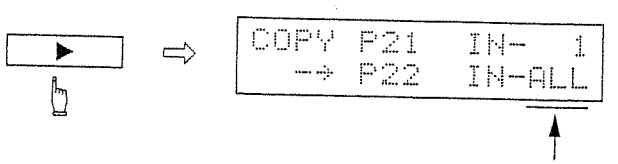
Step 6 Press the Cursor Button to make the Patch Number of the patch that you would like to copy TO flash.



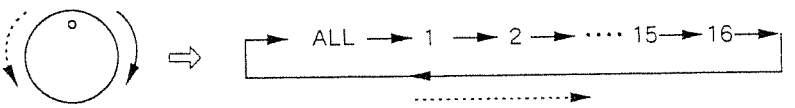
Step 7 Choose the Patch Number of the patch that you would like to copy the original patch data INTO by turning the Alpha Dial.



Step 8 Press the Cursor Button to make the Pad Input Number you would like to copy TO flash.

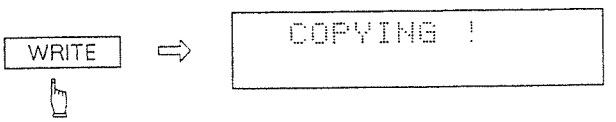


Step 9 Choose the Pad Input Number that you would like to copy TO by turning the Alpha Dial.



Step 10 Press the Write Button.

The Display will display the following while copying is in progress.



Step 11 Press the Copy Button to return the Display to normal.

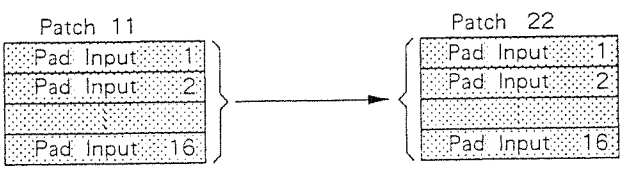
*If you choose ALL for the Pad Input Number to copy either from or into, you cannot select any number (1 to 16) for the other Pad Input Number. A choice such as that will make the following appear in the Display, and the PM-16 will not do any copying.
Should this happen, press the Level Button and start again at Step 4.

```
COPY ERROR !
QUIT : LEVEL KEY
```

[e.g. 1]

```
COPY P11   IN-ALL
  -> P22   IN-ALL
```

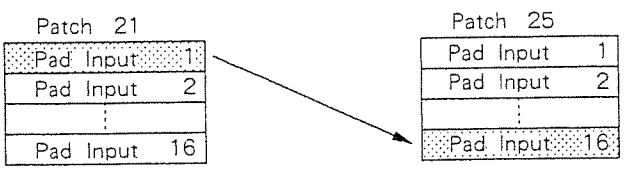
=



[e.g. 2]

```
COPY P21   IN-  1
  -> P25   IN- 16
```

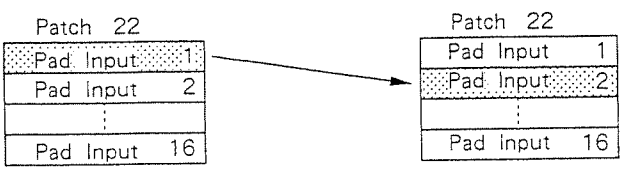
=



[e.g. 3]

```
COPY P22   IN-  1
  -> P22   IN-  2
```

=



b. Making sound without striking a pad

In the Advanced Edit Mode, you can make a sound source emit sound without touching a pad.

Step 1 **Press any of the Number Buttons, 1 to 8.**

This will cause the sound source to emit sound in accordance with the setting of the Pad Input Number shown in the Display.

You can create louder or softer sounds depending on the value of the Pad Input Number that you press. Pressing a higher number will generate a louder sound, just like striking a pad harder will generate a louder sound. Similarly, a lower number will generate a quieter sound, just like striking a pad lightly.

*You can use this function while editing the NOTE NUMBER or the THRESHOLD in the Basic Edit Mode.

5 Other Functions

1. How to use a memory card

Up to 64 patches can be stored in the memory of the main unit. With the optional memory card (M−128D) another 64, making 128 in total, can be kept in memory.

To use these 128 patches effectively, first copy the main unit's 64 patches onto a memory card. This operation is called "saving". Next, edit the patches in the main unit, making 64 new patches. In this way, you can use any of the 128 patches. Naturally, you can also edit the patches contained in a memory card directly. Besides this, you can copy the 64 patches from a memory card into the main unit. This is called "loading". Additionally, you can copy patch or Pad Input Number information individually to and from the main unit and the memory card.

***Read the memory card instructions carefully before using it. Never use any memory card other than the one specified above.**

***Turning the main unit off while a memory card is still inserted will draw energy from the card's lithium battery. Be sure to pull the card out before turning the unit off.**

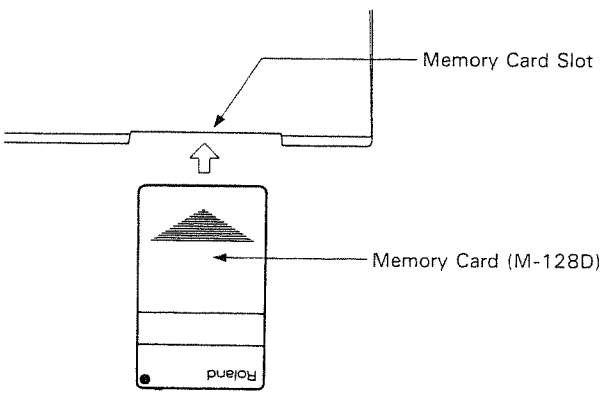
a. Saving onto a memory card

This operation copies the 64 patches stored in the main unit's memory onto a memory card.

1) Saving onto a new memory card

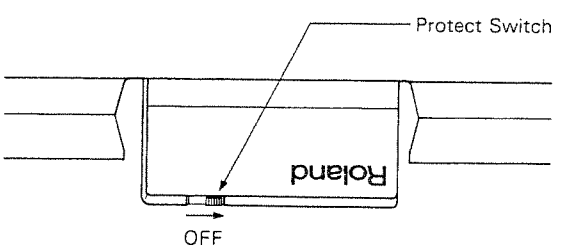
Step 1 — Put an M−128D memory card into the main unit's Memory Card Slot as shown in the figure below.

*Push it in until you hear a click.



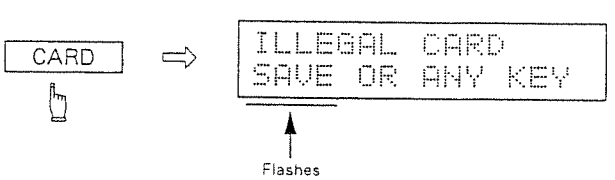
Step 2 — Put the PM−16 in the EDIT or ADV Mode.

Step 3 — Turn the memory card's Protect Switch OFF.



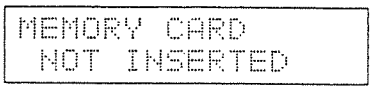
Step 4 — Press the Card Button.

The Display will show the following when a new memory card is inserted. This display shows that the card has not yet been formatted for use with the PM−16.



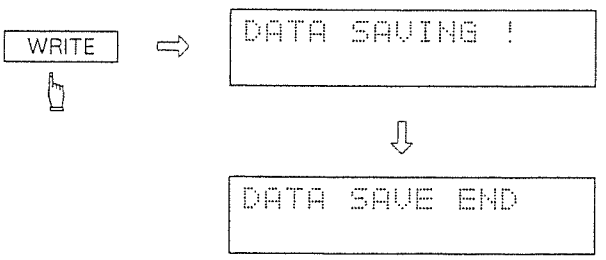
If you would like to stop this Save operation, press any button other than the "Write" button now.

*If the memory card is not inserted correctly, the following display will appear. In this case, re-insert the card.

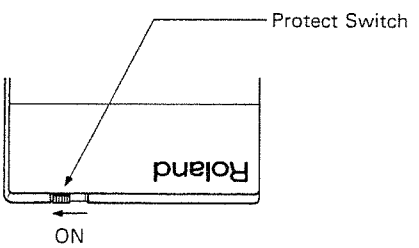


Step 5 Make sure that the word SAVE is flashing, then press the Write Button.

The following display will appear while the main unit's 64 patches are being copied onto the card.



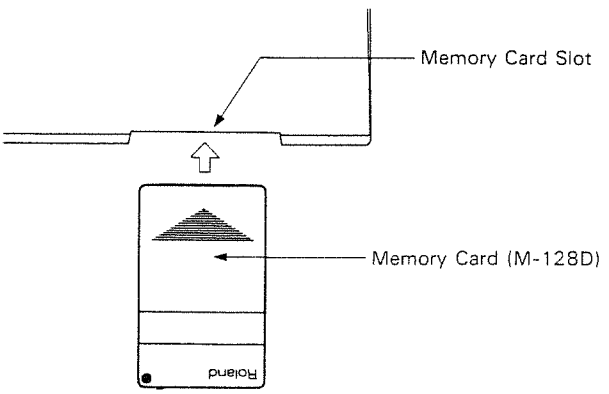
Step 6 Turn the memory card's Protect Switch back ON.



2) Saving onto a used memory card

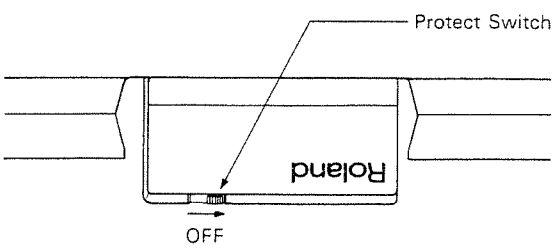
Step 1 Put an M−128D memory card into the main unit's Memory Card Slot as shown in the figure below.

*Push it in until you hear a click.

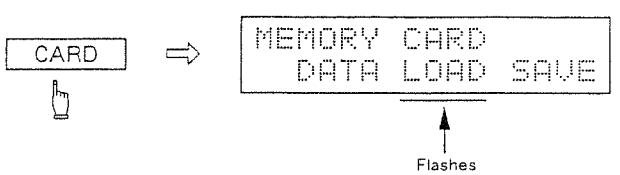


Step 2 Put the PM−16 in the EDIT or ADV Mode.

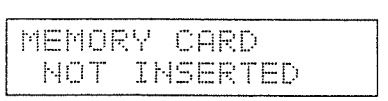
Step 3 Turn the memory card's Protect Switch OFF.



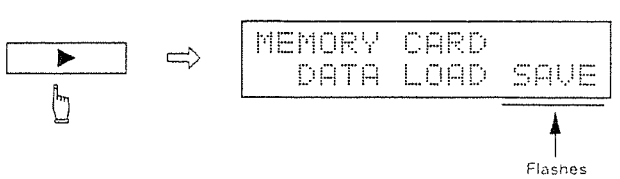
Step 4 Press the Card Button.



*If the memory card is not inserted correctly, the following display will appear. In this case, re−insert the card.

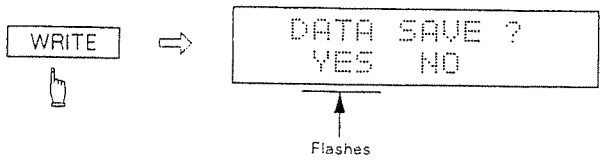


Step 5 Press the Cursor Button to make the word SAVE flash.



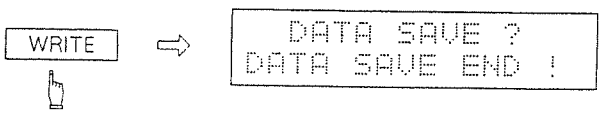
Step 6 **Press the Write Button.**

The following will appear in the Display and the word YES will start to flash.



Step 7 **Press the Write Button again.**

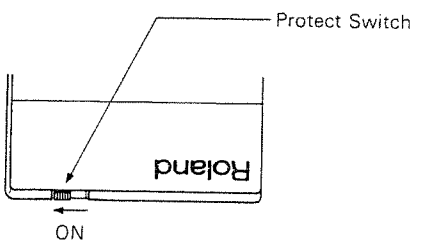
The following display will appear while the main unit's 64 patches are being saved, that is copied, onto the card.



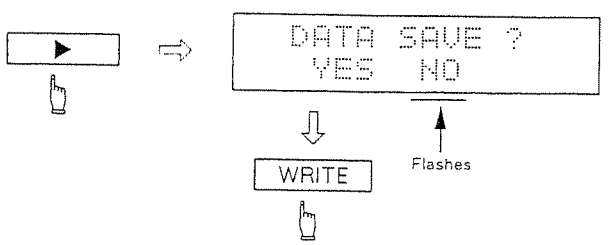
*Note that all of the settings previously stored in the card will be erased.

Step 8 **Press the Card Button to return to the normal display.**

Step 9 **Turn the memory card's Protect Switch back ON.**



If, for any reason, you wish to abort the operation part of the way through, press the Cursor Button to make the word NO flash prior to pressing the Write Button in Step 7. After NO starts flashing, press the Write Button.

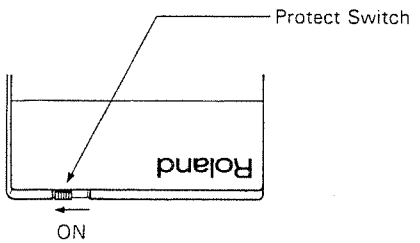


b. Switching between the main unit and memory card patches

You can use up to 128 patches by switching between an inserted memory card that has patch information stored in it, and the main unit.

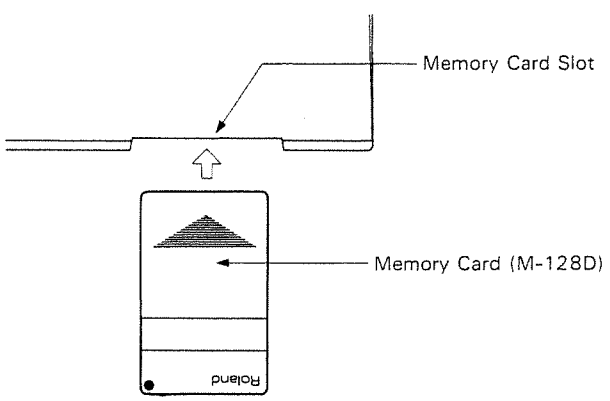
[How to call the patches stored in a memory card]

Step 1 Turn the Protect Switch of the M−128D memory card ON.



Step 2 Put an M−128D memory card into the main unit's Memory Card Slot as shown in the figure below.

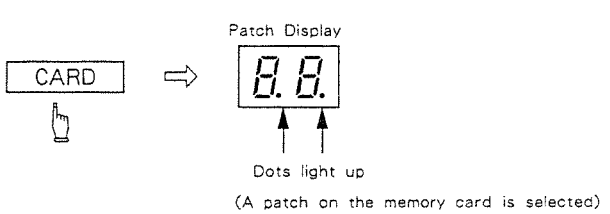
*Push it in until you hear a click.



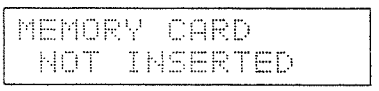
Step 3 Put the PM−16 in the PLAY Mode.

Step 4 Press the Card Button.

There are two dots in the Patch Display that will begin to flash, showing that the patches in the card have been accessed.



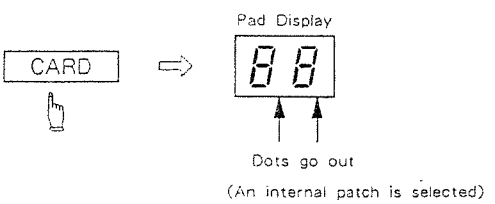
*If the memory card is not inserted correctly, the following display will appear. In this case, re-insert the card.



Step 5 The banks and numbers can be changed in the same way that patches are changed in the main unit.

*The patches stored in the card can be edited in the Basic or Advanced Edit Mode. (If you carry out the procedure for storing edited patches, they will be written directly into the card.)

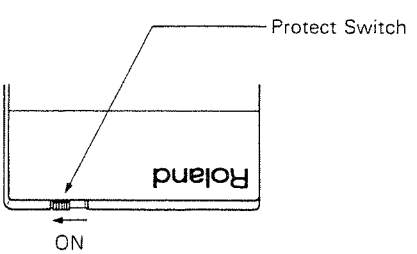
Step 6 Press the Card Button again to switch to the main unit patches. The dots in the Patch Display will stop flashing, indicating that now the main unit patches are being accessed.



c. Loading from a memory card

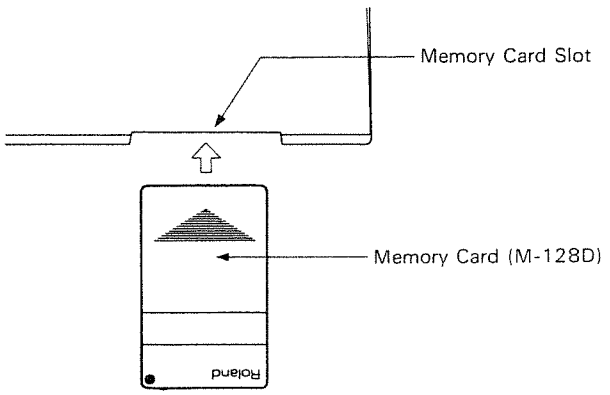
This operation copies the 64 patches stored in a memory card onto those of the main unit.

Step 1 Turn the Protect Switch of the M-128D memory card ON.



Step 2 Put the M−128D memory card into the main unit's Memory Card Slot as shown in the figure below.

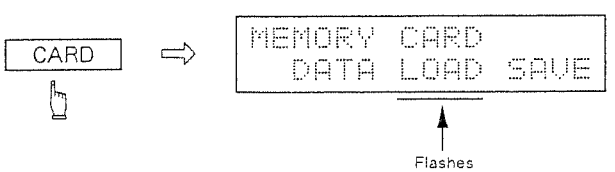
*Push it in until you hear a click.



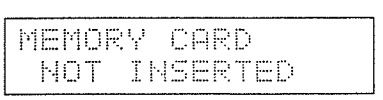
Step 3 Put the PM−16 in the EDIT or ADV Mode.

Step 4 Press the Card Button.

The following will appear in the Display and the word LOAD will start to flash.

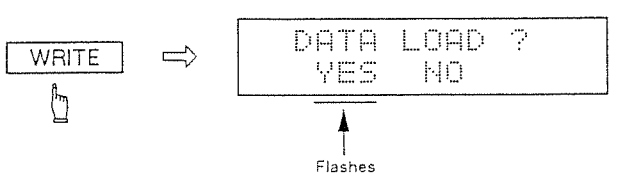


*If the memory card is not inserted correctly, the following display will appear. In this case, re−insert the card.

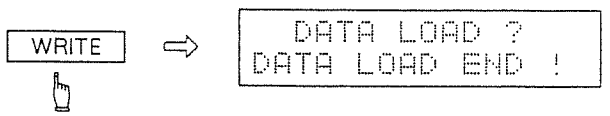


Step 5 Press the Write Button.

The following will appear in the Display and the word YES will start to flash.

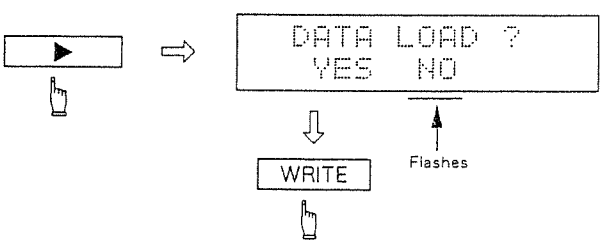


Step 6 If you would like to continue with the load operation, press the Write Button again. The following display will appear while the memory card's 64 patches are being copied into the main unit.



Step 7 Press the Card Button to return to the normal display.

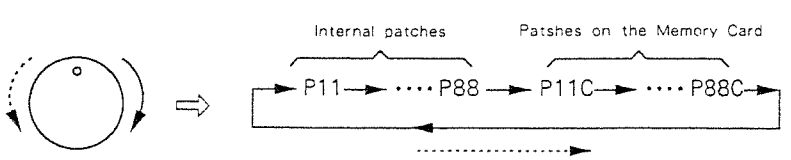
If, for any reason, you wish to abort the operation part of the way through, press the Cursor Button to make the word NO flash prior to pressing the Write Button in Step 6. After NO starts flashing, press the Write Button.



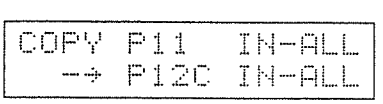
d. Copying patches between the main unit and a memory card

On p. 60 to 63, we explained how to copy patch information from one patch to another in the main unit. While there is a memory card inserted in the main unit that has patch information stored in it, you can also specify patches in the card as ones to copy from or to.

Press the Cursor Button to call the Patch Number to copy from or to. Next, turn the Alpha Dial. The letter "C" will flash after the Patch Numbers are found in the memory card.

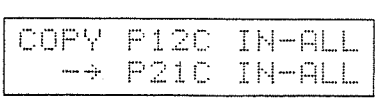


[例1]



= Internal Patch 11 → Patch 12 on the Memory Card

[例2]



= Patch 12 on the Memory Card → Patch 21 on the Memory Card

2. Other MIDI Functions

You can switch the PM−16's patches via MIDI Program Change Information messages sent by an external MIDI device. (See p. 10 of "What is MIDI.") You can also transfer one PM−16's patch information to another PM−16 via MIDI Exclusive Information messages. (See p. 12 of "What is MIDI.")

a. Switching patches via MIDI

Program Change Information sent by an external MIDI device switches the PM−16 patches according to the Program change Number sent. The following table shows the correspondence between Program Change Numbers and Patch Numbers that are to be switched.

	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.	PATCH	PROG.
Internal patches	11	1	12	2	13	3	14	4	15	5	16	6	17	7	18	8
	21	9	22	10	23	11	24	12	25	13	26	14	27	15	28	16
	31	17	32	18	33	19	34	20	35	21	36	22	37	23	38	24
	41	25	42	26	43	27	44	28	45	29	46	30	47	31	48	32
	51	33	52	34	53	35	54	36	55	37	56	38	57	39	58	40
	61	41	62	42	63	43	64	44	65	45	66	46	67	47	68	48
	71	49	72	50	73	51	74	52	75	53	76	54	77	55	78	56
	81	57	82	58	83	59	84	60	85	61	86	62	87	63	88	64
Patches on the Memory Card	11	65	12	66	13	67	14	68	15	69	16	70	17	71	18	72
	21	73	22	74	23	75	24	76	25	77	26	78	27	79	28	80
	31	81	32	82	33	83	34	84	35	85	36	86	37	87	38	88
	41	89	42	90	43	91	44	92	45	93	46	94	47	95	48	96
	51	97	52	98	53	99	54	100	55	101	56	102	57	103	58	104
	61	105	62	106	63	107	64	108	65	109	66	110	67	111	68	112
	71	113	72	114	73	115	74	116	75	117	76	118	77	119	78	120
	81	121	82	122	83	123	84	124	85	125	86	126	87	127	88	128

PATCH : Patch Number PROG. : Program Change

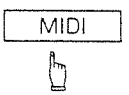
1) Checking and changing the basic channel

To switch the PM−16 patches using Program Change Information messages sent by an external MIDI device, you need to set the MIDI Receive channel of the PM−16, which we shall call the basic channel, to match the external device's MIDI Transit Channel.

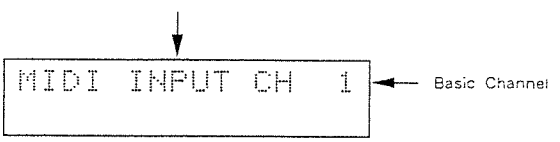
You can check and/or change the PM−16's basic channel with the following procedure.

Step 1 Put the PM−16 in the Basic or Advanced Edit Mode.

Step 2 Press the MIDI Button.



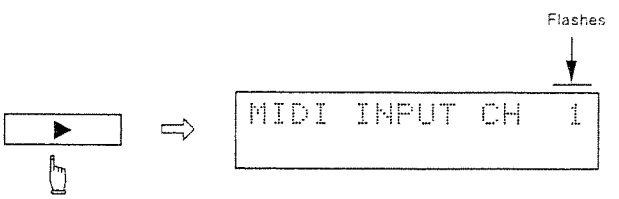
Step 3 Turn the Alpha Dial to call the following item (s).



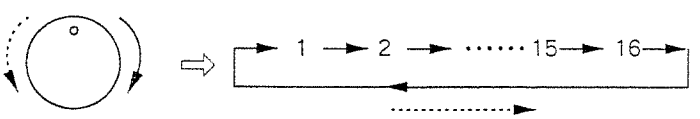
The basic channel is indicated by the number displayed in the upper right corner of the Function Display.

If it is necessary to change the channel, continue with the procedure outlined below.

Step 4 Press the Cursor Button to make the basic channel flash.

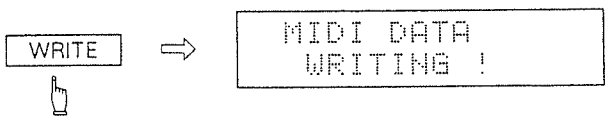


Step 5 Turn the Alpha Dial to change the basic channel.



Step 6 **Press the Write Button.**

The following display will appear while the new basic channel value is being stored in the main unit.



Step 7 **Press the MIDI Button to return the Display to normal.**

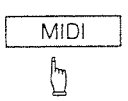
2) Setting OMNI ON/OFF

In addition to this channel capability, MIDI has another capability, which is referred to as OMNI. (See p. 8 of "What is MIDI".) When OMNI is turned ON, any Program Change message sent through any MIDI channel will be accepted, regardless of the basic channel (MIDI Receive Channel) setting.

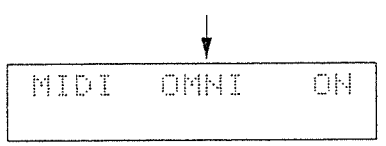
If you do not know the MIDI Transit Channel of an external MIDI device, set the PM-16 to OMNI ON.

Step 1 **Put the PM-16 in the Basic or Advanced Edit Mode.**

Step 2 **Press the MIDI Button.**

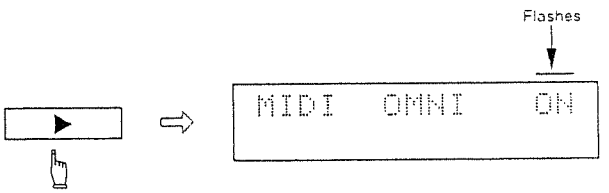


Step 3 **Turn the Alpha Dial to call the following item (s).**

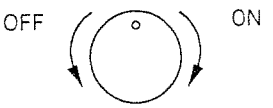


If the upper right corner of the Function Display says ON, the OMNI setting is ON. If it says OFF, OMNI is OFF. If it is necessary to change this setting, continue with the procedure outlined below.

Step 4 Press the Cursor Button to make the OMNI setting flash.

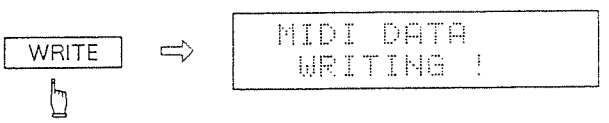


Step 5 Turn the Alpha Dial to change the OMNI setting.



Step 6 Press the Write Button.

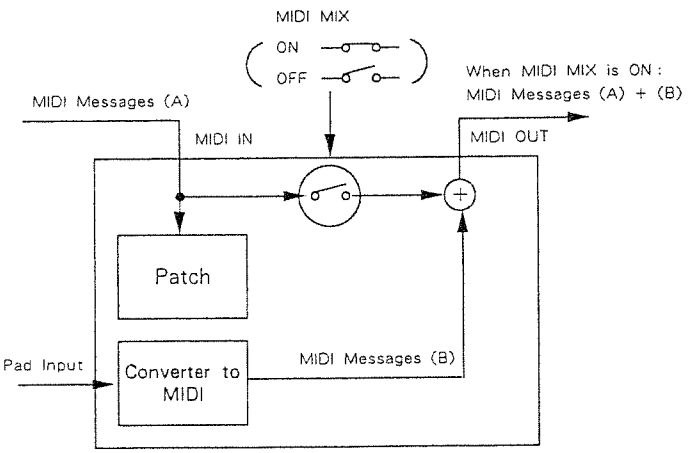
The following display will appear while the new OMNI setting is being written into the main unit.



Step 7 Press the MIDI Button to return the Display to normal.

b. MIDI MIX

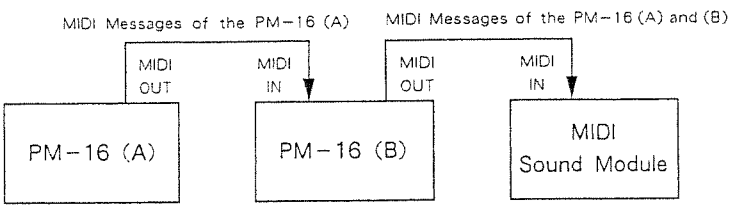
Most MIDI devices do not send information received through MIDI IN directly back out the MIDI OUT. However, the PM-16 can mix information received through MIDI IN with MIDI information produced in the device itself and then output this from the MIDI OUT. This function is called MIDI MIX.



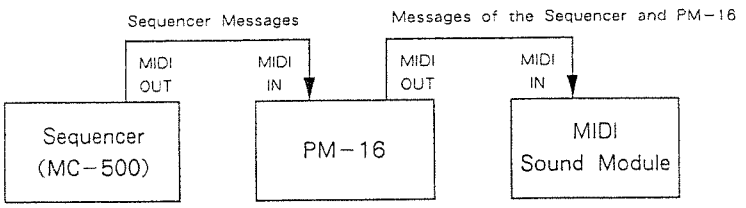
PM-16

For example, this MIDI MIX enables you to, as shown in [Example 1] of the figure below, connect two PM-16s and to set the correspondence between the Program Change Numbers sent on the (A) side with those of the (B) side, so that changing the (A) side patch will automatically change the (B) side patch to the one set up in correspondence with it. In this way, there will be 32 pads in total available for use.

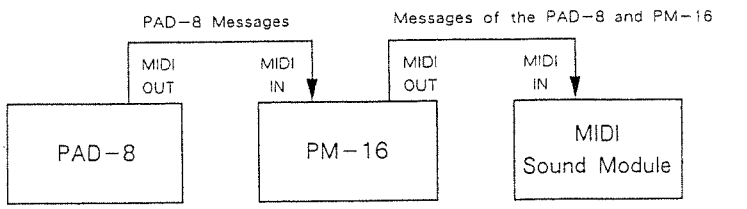
[e.g. 1]



[e.g. 2]



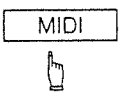
[e.g. 3]



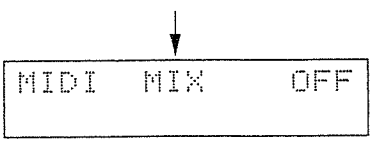
Set to MIDI MIX ON (Information from MIDI IN is sent to MIDI OUT.) or MIDI MIX OFF (Information from MIDI IN is not sent to MIDI OUT.) by doing the following operation.

Step 1 **Put the PM−16 in the Basic or Advanced Edit Mode.**

Step 2 **Press the MIDI Button.**

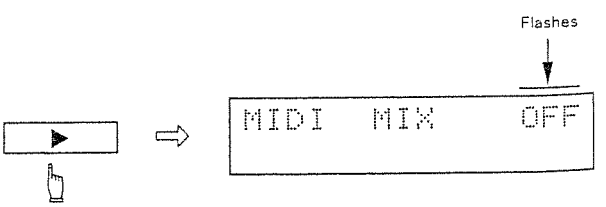


Step 3 **Turn the Alpha Dial to call the following item (s).**

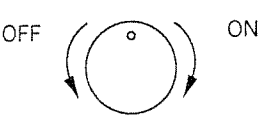


If the upper right corner of the Function Display says ON, the MIDI MIX setting is ON. If it displays OFF, the MIDI MIX is OFF. If it is necessary to change the MIDI MIX setting, continue with the procedure outlined below.

Step 4 **Press the Cursor Button to make the MIDI MIX setting flash.**

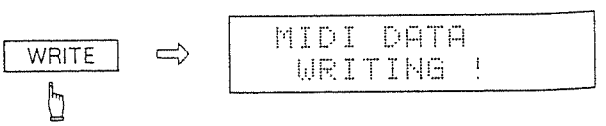


Step 5 **Turn the Alpha Dial to change the MIDI MIX setting.**



Step 6 **Press the Write Button.**

The following display will appear while the new MIDI MIX setting is being stored in the main unit.

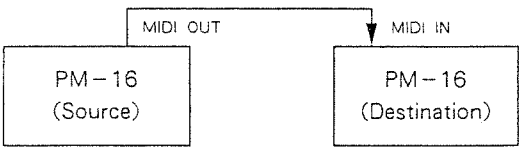


Step 7 **Press the MIDI Button to return the Display to normal.**

c. Transferring patch information via MIDI

With Roland's MIDI Exclusive Information messages, you can transfer all the patch information of one PM−16 to another PM−16 and store that information in the second PM−16.

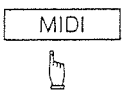
Step 1 **Make the connections shown below. Set the basic MIDI channel of the sending PM−16 to that of the receiving PM−16 by following the procedure explained on p. 75.**



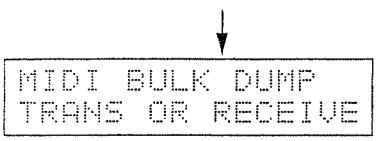
<Receiving end procedure>

Step 2 **Put the receiving PM−16 in the Basic or Advanced Edit Mode.**

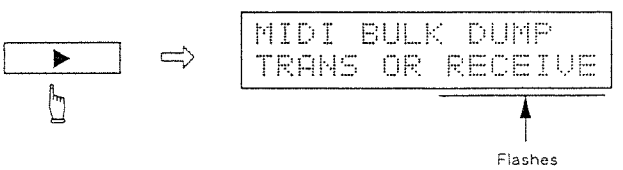
Step 3 **Press the MIDI Button.**



Step 4 **Turn the Alpha Dial to call the following item (s).**



Step 5 **Press the Cursor Button to make the word RECEIVE flash.**



These steps will make the receiving PM−16 ready to receive the patch information that the sending PM−16 will send via MIDI Exclusive Information messages.

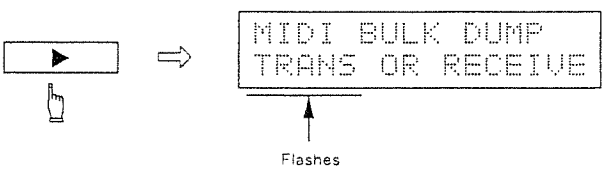
<Sending end procedure>

Step 6 Put the sending PM−16 in the Basic or Advanced Edit Mode.

Step 7 Press the MIDI Button.

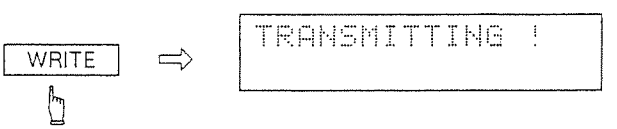
Step 8 Turn the Alpha Dial to call the following item (s).

Step 9 Press the Cursor Button to make TRANS flash.

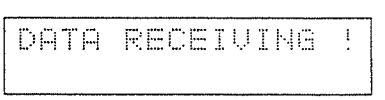


Step 10 Press the Write Button.

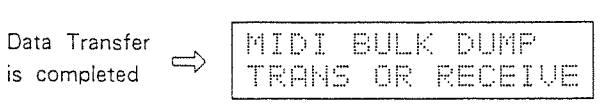
The Display will change as follows while the patch information is being transferred.



When the receiving PM−16 has received all of the patch information, the following display will appear.



When both PM−16's Displays have returned to what they were displaying before the transmission began, the transfer has been completed.



Step 11 When the transfer of patch information is complete, press the MIDI Button of each PM−16 to return their Displays to normal.

ERROR MESSAGES

Operational errors and/or malfunctions can cause displays other than the explanatory messages (drawings) that appear during ordinary operation.

These displays are called error messages.

When an error message appears, ascertain its Cause and follow the instructions given in the "Solutions" column.

Error Message	Cause	What to do
ANALOG LEVEL TEST ERROR !!	Improper signal is fed into a Pad Input Jack.	Switch the unit off, rotate the Sens Knob fully counterclockwise, then switch it on again. If the error messages is shown again, call your local Roland service station.
STATIC RAM R/W TEST ERROR !!	There is something wrong with the unit ifself.	Call your local Roland service station.
MEMORY CARD R/W TEST ERROR !!	There is something wrong with the memory card or the card circuits of the PM-16.	Replace with a proper memory card. If the error message is shown again, call your local Roland service station.
MEMORY CARD NOT INSERTED	The memory card is not securely inserted.	Insert the memory card securely.
MEMORY CARD REPLACE BATTERY	The battery built in the memory card is flat.	Replance the battery with a new one as explained in the instructions of the memory card.
CARD PROTECTED QUIT → LEVEL KEY	The Protect Switch on the memory card is set to the ON position, therefore writing is not possible.	Set the Protect Switch to the OFF position, push the Level/Name Button, and repeat the writing procedure.
SUM CHECK ERROR	Patch data transferred with the Exclusive messages was not properly done.	Repeat data transfer from the beginning. If the error messages is shown again, call your local Roland service station.
COPY ERROR ! QUIT → LEVEL KEY	The Pad number of the source or destination pad is not correctly selected (or either of the source or destination is set to ALL), therefore copy cannot be performed.	Push the Level/Name Button and select a proper Pad number.

SETTING MEMO

Patch :
Title :

Parameter \ Pad Input Channel		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIDI Channel																	
Note Number																	
Program Change	MIDI Channel																
	Number																
Gate Time																	
Threshold																	
Dynamics Curve																	
Dynamics Pitch																	
Bend Depth																	
Bend Decay																	
Dynamics Bend																	
Minimum Velocity																	
Layer																	
Retrigger Limit Time																	

Patch :
Title :

Parameter \ Pad Input Channel		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIDI Channel																	
Note Number																	
Program Change	MIDI Channel																
	Number																
Gate Time																	
Threshold																	
Dynamics Curve																	
Dynamics Pitch																	
Bend Depth																	
Bend Decay																	
Dynamics Bend																	
Minimum Velocity																	
Layer																	
Retrigger Limit Time																	

Patch :
Title :

Parameter \ Pad Input Channel		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIDI Channel																	
Note Number																	
Program Change	MIDI Channel																
	Number																
Gate Time																	
Threshold																	
Dynamics Curve																	
Dynamics Pitch																	
Bend Depth																	
Bend Decay																	
Dynamics Bend																	
Minimum Velocity																	
Layer																	
Retrigger Limit Time																	

Patch :
Title :

Parameter \ Pad Input Channel		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIDI Channel																	
Note Number																	
Program Change	MIDI Channel																
	Number																
Gate Time																	
Threshold																	
Dynamics Curve																	
Dynamics Pitch																	
Bend Depth																	
Bend Decay																	
Dynamics Bend																	
Minimum Velocity																	
Layer																	
Retrigger Limit Time																	

MODEL PM-16 **MIDI Implementation** Version : 1.00

1.TRANSMITTED DATA

■Note events

Specified Note # and MIDI channel # are assignable to individual PAD inputs.Each combination can be stored into a PATCH (non volatile).

Note off

Status	Second	Third
9nH	kkH	00H

kk = Note # : 00H-7FH (0-127)
n = MIDI channel : 0H-FH (1-16)

Note on

Status	Second	Third
9nH	kkH	vvH

kk = Note # : 00H-7FH (0-127)
vv = Velocity : 00H-7FH (0-127)

■Program change

Status	Second
CnH	ppH

pp=Program change : 0H-7FH (0-127)

When the PROG # and/or CH in a PATCH are edited on the PM-16, changing to this PATCH in play mode will send the Program change message on this channel.

■Pitch bender

Status	Second	Third
EnH	llH	mmH

ll=0H-7FH (0-127)
mm=0H-7FH (0-127)

When a parameter, BEND DEPTH, in a PATCH is edited, hitting the corresponding PAD will transmit the Pitch bend information including BEND DEPTH, BEND DECAY and DYNAMIX BEND values set in that PATCH.

■System exclusive

Status
F0H : System Exclusive
F7H : EOX (End of System Exclusive)

See 3.EXCLUSIVE COMMUNICATIONS for details.

2.RECOGNIZED RECEIVE DATA

■Program change

Status	Second
CnH	ppH

ppH = Program change : 0H-7FH (0-127)

The PM-16 will change to the PATCH defined by the Program change message received on its basic channel.Refer to the PM-16 Owner's Manual for assignment of Program change numbers to PATCH numbers and for basic channel setup.

■Mode message

OMNI OFF

Status	Second	Third
BnH	7CH	00H

OMNI ON

Status	Second	Third
BnH	7DH	00H

■System exclusive

Status
F0H : System Exclusive
F7H : EOX (End of System Exclusive)

See 3. EXCLUSIVE COMMUNICATIONS for details.

3.EXCLUSIVE COMMUNICATIONS

See the PM-16 Owner's Manual for transmission and reception of Exclusive messages.

One way communication

■Data set

A set of the following messages is recognized only when aaH and bbH in the Start and End addresses of the PATCH data are as specified in the PATCH dataaddress mapping shown below.The data recognized are stored into memory locations addressed by the data set, respectively.

Byte	Description
F0H	Exclusive status
41H	Roland-ID
0nH	Device-ID=MIDI Basic channel
19H	Model-ID (PM-16)
12H	Command-ID (DT1)
aaH	Address (MSB)
bbH	Address (LSB)
ddh	Date dd = 01H - 7FH
:	:
ddH	Data
ssH	Sum ss : aaH+bbH+ddH+...+ddH+ssH=0
F7H	EOX (End of Exclusive)

■ PATCH data address mapping

In transmitting and receiving exclusive message data, the PM-16 handles all the PATCH data in memory as a package.Neither PATCHES nor Parameters can be transferred as a single information unit.

Address		Description
aaH (MSB)	bbH (LSB)	
00H	00H	PATCH data start address PATCH data
7AH	7FH	PATCH data end address

MODEL PM-16

MIDI Implementation Chart

Date : Jun. 8. 198
Version : 1.00

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default	1-16	1-16	memorized
	Changed	1-16	1-16	
Mode	Default	Mode 3	Mode 1	memorized
	Messages		Omni On/Off	
	Altered	*********		
Note Number		0-127	×	
	True Voice	*********	×	
Velocity	Note ON	○ 9n v=1-127	×	
	Note OFF	× 9n v=0	×	
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bender		○	×	
Control Change		×	×	
Prog Change		○ 0-127	○ 0-127	recognized
	True #	*********		64-127=M-Card
System Exclusive		○	○	
System Common	Song Pos	×	×	
	Song sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Message	Local ON/OFF	×	×	
	All Notes OFF	×	×	
	Active Sense	×	×	
	Reset	×	×	
Notes		MIDI message received from MIDI IN is transmitted to MIDI OUT when MIDI MIX is set at "ON".		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

Number / Bank	1	2	3	4	5	6	7	8
1								
2								
3								
4								
5								
6								
7								
8								

Number / Bank	1	2	3	4	5	6	7	8
1								
2								
3								
4								
5								
6								
7								
8								

SPECIFICATIONS

● **PM−16 . . . . Pad−MIDI interface**

● **Memory Capacity**
Internal Memory : 64 patches
Memory Card (M−128D) : 64 patches

● **Elements to be Set**

<Basic EDIT Mode>
MIDI Channel
Note Number
Program Change
Gate Time
Threshold

<Advanced EDIT Mode>
MIDI Channel
Note Number
Program Change
Gate Time
Threshold
Dynamics Curve
Dynamics Pitch
Bend Depth
Bend Decay
Dynamics Bend
Minimum Velocity
Layer
Retrigger Limit Time

● **Displays**
Patch Displays
(7 segment LED ×2)
Function Display
(16 character, 2 line LCD display with back light)

● **Control**

<Front Panel>
Input Level (LINE/PAD, MIC) ×16
Sensitivity Knobs ×16
Alpha Dial
Number Buttons ×8
Bank Button
Write Button
Copy Button
MIDI Button
Level/Name Button
Card Button
Cursor (◄,►)

<Rear Panel>
Mode Switch (PLAY/EDIT/ADV)
Power Switch
LCD Contrast Knob

● **Connectors**
Pad Input Jack ×16
Patch Shift Jack (UP, DOWN)
MIDI IN Connector
MIDI OUT Connector
AC Adapter Jack

● **Power Consumption**
2.7 W

● **Dimensions**
313 (W) ×245 (D) ×72 (H) mm
12−5/6"×9−5/8"×2−13/16"

● **Weight**
1.8 kg/ 3 lb 15 oz

● **Accessories**
AC Adaptor
Owner's Manual
"What is MIDI" Booklet
MIDI Cable

● **Options**
PD−11 (bass drum pad)
PD−21 (tom/snare pad)
PD−31 (tom/snare pad with three rims and one face sensor output)
M−128D (memory card)
DP−2 (pedal switch)
FS−5U (BOSS footswitch)
APC−66 (all purpose clamp set)
MDS−1 (pad stand)
PCS−250Q (2.5m four−parallel cable)
PCS−500Q (5m four−parallel cable)

*** These specifications and this configuration are subject to change without prior notice.**

Roland Exclusive Messages

1. Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all exclusive messages (type IV) :

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Maindata
F7H	End of exclusive

MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufactures-ID immediately after F0H (MIDI version1.0).

Manufactures- ID : 41H

The Manufactures-ID identifies the manufacturer of a MIDI instrument that triggeres an exclusive message. Value 41H represents Roland's Manufactures-ID.

Device- ID : DEV

The Device-ID contains a unique value that identifies the individual device in the multiple implementation of MIDI instruments. It is usually set to 00H - 0FH, a value smaller by one than that of a basic channel, but value 00H - 1FH may be used for a device with multiple basic channels.

Model- ID : MDL

The Model-ID contains a value that uniquely identifies one model from another. Different models, however, may share an identical Model-ID if they handle similar data.

The Model-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model-IDs, each representing a unique model :

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

Command- ID : CMD

The Command-ID indicates the function of an exclusive message. The Command-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command-IDs, each representing a unique function :

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

Main data : BODY

This field contains a message to be exchanged across an interface. The exact data size and contents will vary with the Model-ID and Command-ID.

2. Address- mapped Data Transfer

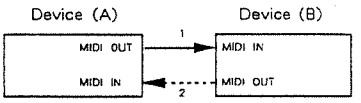
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records--waveform and tone data, switch status, and parameters, for example--to specific locations in a machine-dependent address space, thereby allowing access to data residing at the address a message specifies.

Address-mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures : one-way transfer and handshake transfer.

One- way transfer procedure (See Section3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

Connection Diagram

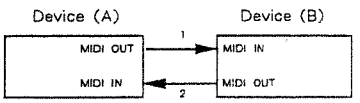


Connectionat point2 is essential for "Request data" procedures. (See Section3.)

Handshake- transfer procedure (See Section4 for details.)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

Connection Diagram



Connectionat points1 and 2 is essential.

Notes on the above two procedures

*There are separate Command-IDs for different transfer procedures.
*DevicesA and B cannot exchange data unless they use the same transfer procedure, share identical Device-ID and Model ID, and are ready for communication.

3. One- way Transfer Procedure

This procedure sends out data all the way until it stops when the messages are so short that answerbacks need not be checked.
For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20milliseconds in between.

Types of Messages

Message	Command ID
Request data 1	RQ1 (11H)
Data set 1	DT1 (12H)

Request data # 1 : RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.
On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
11H	Command ID
aaH ⋮	Address MSB ⋮ LSB
ssH ⋮	Size MSB ⋮ LSB
sum	Check sum
F7H	End of exclusive

*The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set 1 : DT1 (12H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more data as well as a series of data formatted in an address - dependent order.

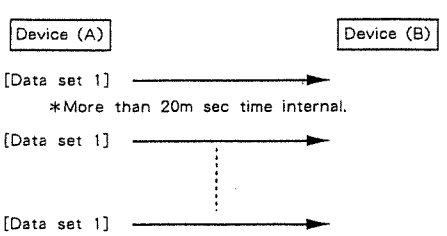
The MIDI standards inhibit non-real time messages from interrupting an exclusive one. This fact is inconvenient for the devices that support a "soft-through" mechanism. To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
12H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

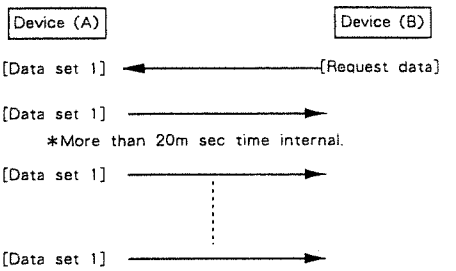
*A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The number of bytes comprising address data varies from one Model-ID to another.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Example of Message Transactions

● Device A sending data to Device B
Transfer of a DT1 message is all that takes place.



● Device B requesting data from Device A
Device B sends an RQ1 message to Device A. Checking the message, Device A sends a DT1 message back to Device B.



4. Handshake- Transfer Procedure

Handshaking is an interactive process where two devices exchange error checking signals before a message transaction takes place, thereby increasing data reliability. Unlike one-way transfer that inserts a pause between message transactions, handshake transfer allows much speedier transactions because data transfer starts once the receiving device returns a ready signal.

When it comes to handling large amounts of data--sampler waveforms and synthesizer tones over the entire range, for example--across a MIDI interface, handshaking transfer is more efficient than one-way transfer.

Types of Messages

Message	Command ID
Want to send data	WSD (40H)
Request data	RQD (41H)
Data set	DAT (42H)
Acknowledge	ACK (43H)
End of data	EOD (45H)
Communication error	ERR (4EH)
Rejection	RJC (4FH)

Want to send data : WSD (40H)

This message is sent out when data must be sent to a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of the data to be sent.

On receiving a WSD message, the remote device checks its memory for the specified data address and size which will satisfy the request. If it finds them and is ready for communication, the device will return an "Acknowledge (ACK)" message.
Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
40H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

*The size of the data to be sent does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the data should reside.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Request data : RQD (41H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQD message, the remote device checks its memory for the data address and size which satisfy the request. If it finds them and is ready for communication, the device will transmit a "Data set (DAT)" message, which contains the requested data. Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
41H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

*The size of the requested data does not indicate the number of bytes, that make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set : DAT (42H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, the message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft- through" mechanism for such interrupts. To maintaincompatibility with such devices, Roland has limited the DAT to 256bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
42H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

*A DAT message is capable of providing only the valid data among those specified by an RQD or WSD message.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The number of bytes comprising address data varies from one model ID to another.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Acknowledge : ACK (43H)

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
43H	Command ID
F7H	End of exclusive

End of data : EOD (45H)

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
45H	Command ID
F7H	End of exclusive

Communications error : ERR (4EH)

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
4EH	Command ID
F7H	End of exclusive

Rejection : RJC (4FH)

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when :

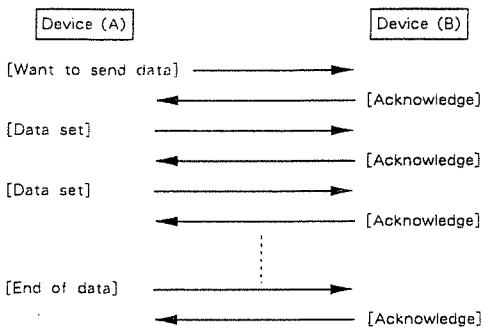
- a WSD or RQD message has specified an illegal data address or size,
- the device is not ready for communication.
- an illegal number of addresses or data has been detected.
- data transfer has been terminated by an operator.
- a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

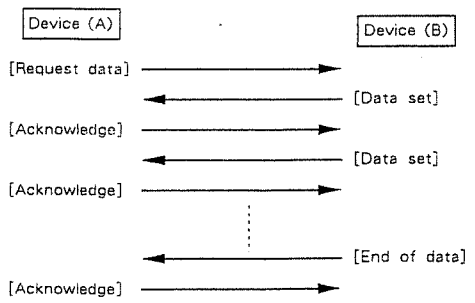
Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
4FH	Command ID
F7H	End of exclusive

Example of Message Transactions

● Data transfer from device (A) to device (B).

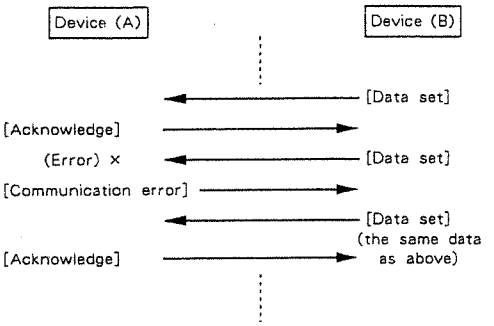


● Device (A) requests and receives data from device (B).

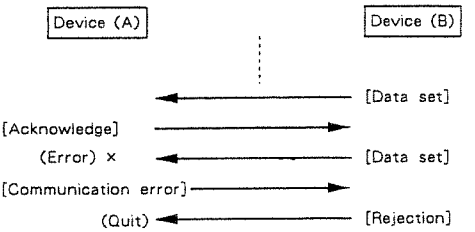


● Error occurs while device (A) is receiving data from device (B).

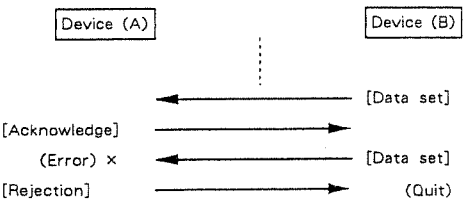
1) Data transfer from device (A) to device (B).



2) Device (B) rejects the data re-transmitied, and quits data transfer.



3) Device (A) immediately quits data transfer.



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