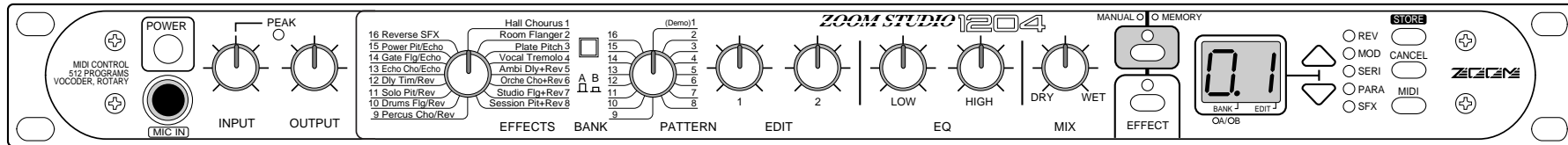


ZOOM STUDIO 1204

Operation Manual



Thank you for selecting the *ZOOM STUDIO 1204* (hereafter simply called the "1204").

Major Features

The 1204 is a multi-effect device with the following features:

- **512 preset effect programs (32 effects x 16 patterns)**
Memory capacity for storing up to 100 of your own effect settings, resulting in a total of 612 available effect sounds.
- **Easily changeable parameters let you create your own effect settings.**
- **Manual mode allows editing parameters in real time while using an effect.**
Memory mode lets the user instantly choose any of 100 stored effects.
- **Control by external MIDI equipment possible.**
- **Integrated 18-bit A/D and D/A converter with sampling frequency of 44.1 kHz achieves professional sound quality at an astonishingly affordable price.**

Organization of This Manual

This manual consists of the following chapters.

- **The Basics:** This chapter lists the names of controls and parts, and describes how to connect and set up the 1204.
- **Operation:** This chapter explains how to use the 1204.
- **Effect Types, Effect Patterns, Effect Parameters:** This chapter describes the various effect types, effect patterns, and effect parameters.
- **Important Information:** This chapter contains troubleshooting steps and safety precautions.

■ When using the 1204 for the first time

- (1) First read the section "Safety Precautions" in the chapter "Important Information."
- (2) Refer to the chapter "The Basics" to connect and set up your 1204.
- (3) Refer to the chapter "Operation" to try out the various effects.
- (4) When wishing to edit effects to create your own sound, refer to the chapter "Effect Types, Effect Patterns, Effect Parameters."

■ In case of trouble

If the 1204 does not seem to function correctly, please refer to the section "Troubleshooting" in the chapter "Important Information."

**Please take the time to read this manual carefully so as to get the most out of your 1204 and to ensure optimum performance and reliability.
Retain this manual, the warranty card and all other documentation for future reference.**

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Safety Precautions

In this manual, important information that is intended to prevent the danger of injury to persons and damage to equipment is marked with special symbols. The meaning of these symbols is explained below. Please read this information carefully and observe all precautions and instructions.



Warning

This symbol indicates explanations about extremely dangerous matters. If users ignore this symbol and handle the device the wrong way, serious injury or death could result.



Caution

This symbol indicates explanations about dangerous matters. If users ignore this symbol and handle the device the wrong way, bodily injury and damage to the equipment could result.

Other Symbols



This symbol indicates a precaution or warning. The information is printed close to the symbol.



This symbol indicates a general prohibited action. The information is printed close to the symbol.



This symbol indicates a specific prohibited action. The information is printed within the symbol or close to it. (Example at left: Do not disassemble.)



This symbol indicates a required action. The information is printed within the symbol or close to it. (Example at left: Disconnect the AC adapter.)

AC Adapter Precautions



Warnings



The supplied AC adapter is designed only for Zoom products with an input rated for 9 V DC, 300 mA, center minus. Never use the adapter for any other product or purpose.

- Using the adapter with a product that requires a different voltage or polarity poses a risk of fire and electric shock.



Use only the supplied AC adapter to power the unit.

- Using the unit with an adapter rated for a different voltage or polarity poses a risk of fire and electric shock.



Plug the supplied AC adapter only into an AC outlet rated for the voltage as shown on the adapter.

- Plugging the adapter into an outlet rated for a different voltage poses a risk of fire and electric shock.



Do not short-circuit the adapter terminals or cable.

- Any short-circuiting poses a risk of fire and electric shock.



When disconnecting the AC adapter from the AC outlet, always grasp the adapter itself.

- Pulling the adapter out by the cord or damaging the cord poses a risk of fire and electric shock.



Do not place heavy objects on the AC adapter or the cord and do not use metal clamps or similar with the cord.

- Damaging the cord poses a risk of fire and electric shock.

■ 1204 Usage Precautions



Warnings



Do not try to open the case of the unit or attempt any alterations.

- Opening the unit poses a risk of fire and electric shock. Zoom Corporation does not assume responsibility for any injury, accidents, damage, or malfunction caused by unauthorized alterations.



Protect the unit from high temperatures. Do not store or use it in locations exposed to direct sunlight, close to heating appliances or anywhere where the ambient temperature can exceed 40 °C.

- Extreme temperatures can lead to leakage current or short-circuits which pose a risk of fire and electric shock.



Protect the unit from high humidity. Do not store or use it in locations subject to high humidity, such as outdoors in rainy weather, in a bathroom, etc.

- Extreme humidity can lead to leakage current or short-circuits which pose a risk of fire and electric shock.



Protect the unit from extremely low temperatures. Do not store or use it in locations where the ambient temperature can drop below 0 °C.

- Extreme temperatures can lead to leakage current or short-circuits which pose a risk of fire and electric shock.



Protect the unit from shocks and vibrations, and do not use it in locations with high levels of dust, sand, or other contamination.

- Damage to electrical parts poses a risk of fire and electric shock.



Do not touch the unit or connected equipment during a thunderstorm.

- Touching the unit under such conditions poses a risk of electric shock.



Precautions



Use the unit on a stable surface where it cannot fall over or be dropped.

- Dropping the unit can lead to damage. When using the unit in a rack, fasten it securely.



When not using the unit for a long time, disconnect the AC adapter from the AC outlet.

- Leakage current or short-circuits pose a risk of fire.



Turn all equipment off before making or changing any connections.

- Sudden noise surges can lead to hearing damage or damage to equipment.



Before moving the unit, turn off all equipment and disconnect the AC adapter and all other cables.

- Failure to observe this precaution can lead to damage to connected equipment.



This unit is a precision instrument. Do not exert undue pressure on keys, knobs, and other controls.

- Damage to electrical parts poses a risk of fire and electric shock.



Do not stack the unit directly on top of other components.

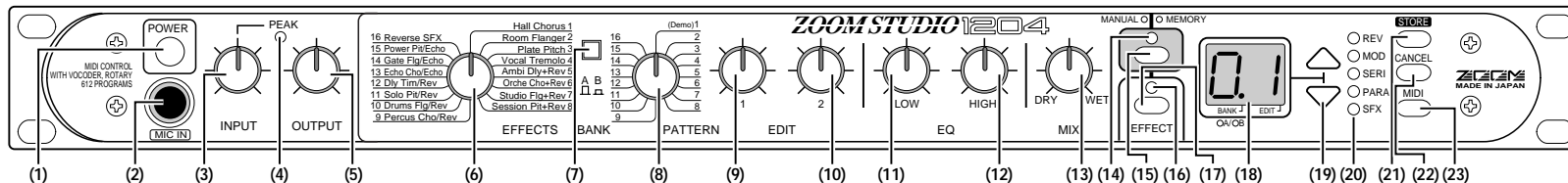
- Overheating poses a risk of fire and can lead to performance degradation of the unit.

THE BASICS

This chapter describes the controls and other parts of the 1204, as well as installation, setup, and connection to other equipment.

Controls and Functions

■ Front Panel



(1) POWER switch

Serves to turn the 1204 on and off.

(2) MIC IN jack

A microphone can be connected to this jack. Normally, the signal from this jack is mixed with the rear input. When using the Vocoder effect, the signal from the microphone input becomes the effect envelope signal. If you wish to use a microphone other than offered by Zoom, choose a dynamic microphone with an impedance of 600 ohms.

(3) INPUT level control

Adjusts the level of the input signal from an instrument or other program source.

(4) PEAK indicator

If the input signal exceeds the peak level, this indicator lights up.

(5) OUTPUT level control

Adjusts the output signal level.

(9) EDIT1 control

(10) EDIT2 control

With these controls, the user can adjust the parameters of the currently selected effect. The types of parameters which can be adjusted depends on the effect.

(11) EQ LOW gain control

(12) EQ HIGH gain control

These controls adjust the low-frequency range and high-frequency range of the effect sound. In the center position, frequency response is flat. Turning the control to the left (counterclockwise) attenuates the respective frequency range and turning the control to the right (clockwise) emphasizes it.

(13) MIX LEVEL control

This control adjusts the balance between DRY (original) and WET (effect) sound. If the control is turned fully to the left (counterclockwise), only the original sound is output. If the control is turned fully to the right (clockwise), only the effect sound is output.

(18) Display

Shows memory numbers and various other information for operating the 1204.

(19) ▲▼ (value up/down) keys

Serve for selecting memory numbers and changing the setting of parameters.

Pressing the ▲ (value up) key once increases the number by one count and pressing the ▼ (value down) key decreases the number by one count.

(20) Category indicators

The effects of the 1204 are divided into several categories. These indicators show to which category an effect belongs.

(21) STORE key

When an effect was edited in manual mode or memory mode, the changed parameters can be stored in memory by pressing this key.

(6) **EFFECT selector**

Serves to select the type of effect to be used. Effects are grouped in banks A and B with 16 effects each, giving a choice of 32 effects.

(7) **BANK switch**

Serves to switch between effect banks A and B.

(8) **PATTERN selector**

Determines the effect pattern. For each effect, 16 different patterns are available.

(14) **MODE indicator**

(15) **MODE key**

Switches between manual mode and memory mode. In manual mode, the indicator is lit. In memory mode, the indicator is out.

(16) **EFFECT indicator**

(17) **EFFECT key**

Switches the effects on and off. When switched off, only the original sound is heard and the indicator is out. When effects are switched on, the indicator is lit.

(22) **CANCEL key**

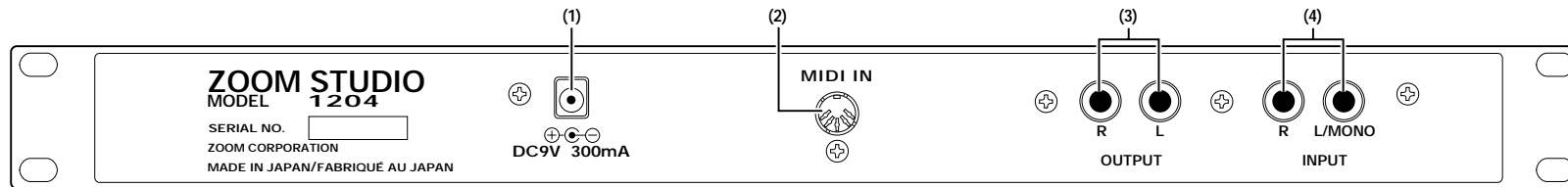
This key can be used to cancel the store process. (The key does not function as an undo key if the STORE button has already been pressed the second time.)

The CANCEL key also serves to terminate the MIDI channel setting function.

(23) **MIDI key**

This key activates the MIDI channel setting function, which allows receiving MIDI signals in memory mode.

■ **Rear Panel**



(1) **DC INPUT jack**

The cable from the supplied AC adapter is connected here.

(2) **MIDI jack**

Serves for connection to equipment with a MIDI OUT jack, such as another effect device, synthesizer or similar. MIDI signals from that equipment can be used to control the 1204.

(3) **OUTPUT jacks**

Serve for connection to the return jacks of an instrument or mixer, or to recording/playback equipment.

(4) **INPUT jacks**

Serve for connection to the sound source, such as the send jack of an instrument or mixer.

Note: A preamplifier (such as integrated in a mixer) or a compact effect device is required when wishing to use the 1204 with an instrument with low output level, such as an electric guitar or bass, or with a high-impedance instrument (470 kilohms or higher).

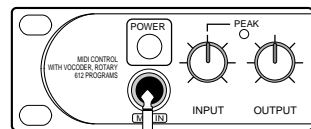
Connections

Connect an electronic instrument, microphone, mixer, or other audio equipment to the 1204 as described below.

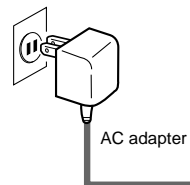
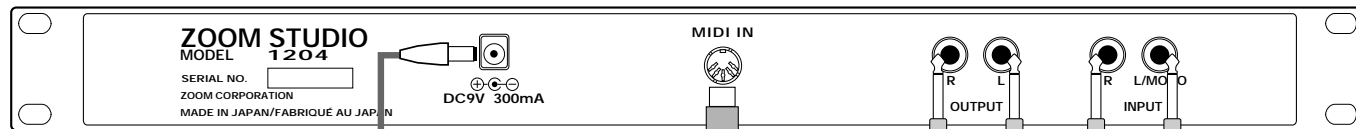


Precaution

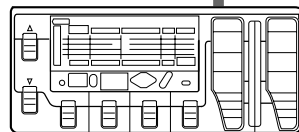
Before making any connections, set the power switches of all equipment to OFF.
If the equipment is on, sudden noise surges can lead to hearing damage or damage to the equipment.



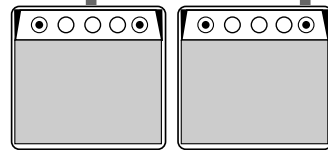
Microphone



AC adapter



Electronic instrument



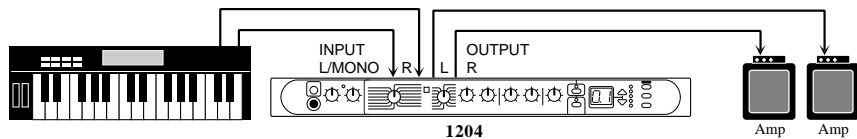
Amplifier



Keyboard

■ Connection between electronic instrument and playback equipment

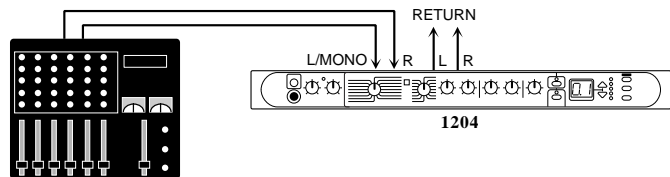
This connection example shows use of the 1204 as an effect device for electronic instruments. When using the unit in a monaural configuration, connect only the L jack. The balance between the original sound of the instrument and the effect sound is adjusted by the MIX LEVEL control.



■ Connection to send/return jacks of a mixer

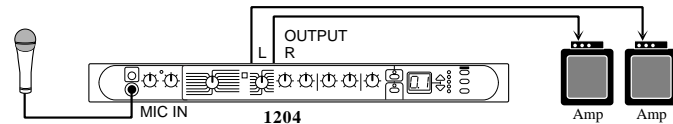
This connection example shows use of the 1204 in the send/return loop of a mixer to which instruments or other sound sources are connected.

In this case, the balance between the original sound of the mixer (DRY) and the effect sound produced by the 1204 (WET) is normally adjusted at the mixer. Therefore the MIX LEVEL control of the 1204 should be turned fully clockwise, so that only the WET sound is returned to the mixer.



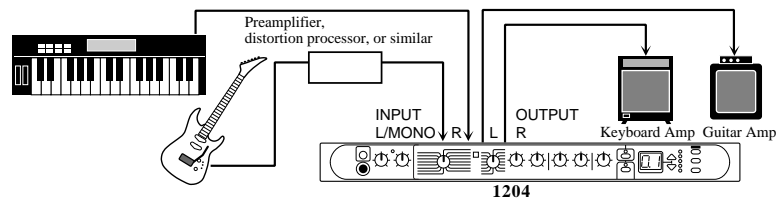
■ Connection between microphone and playback equipment

This connection example shows use of the 1204 as an effect device for vocals. Use a dynamic microphone with an impedance of 600 ohms. Plug the microphone into the MIC IN jack on the front panel of the 1204. If connected to a rear-panel INPUT jack, the volume level will not be sufficient. Normally, the signals fed to the INPUT jacks on the rear panel and the MIC IN jack on the front panel will be mixed and processed by the same effect. An exception is the Vocoder effect. When this effect is active, the signal from the MIC IN jack on the front panel and the right INPUT jack on the rear panel is mixed and used as envelope signal for controlling the Vocoder. Only the signal from the left INPUT jack on the rear panel is effect-processed and heard as sound. (The balance between the signals from the MIC IN jack and right INPUT jack can be adjusted with the EDIT 2 control.)



■ Using two effects in parallel

The 1204 allows the simultaneous use of two effects in parallel. This is possible with the effects in bank B marked with a "/" on the display. This connection example shows how to use such effects independently in a parallel configuration.



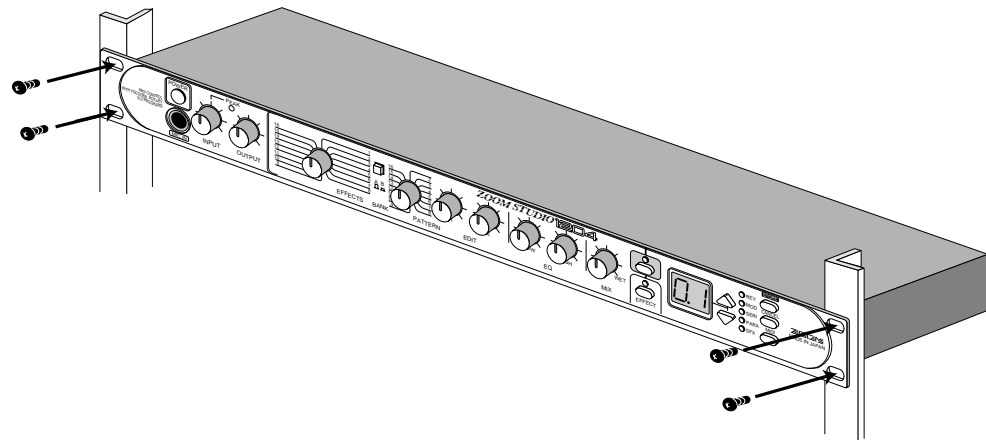
Rack Mount



Precaution

- **This unit uses a metal enclosure and is heavier than it might seem at first glance.**
When mounting the unit in a rack, be sure to fasten it securely with screws, and use a rack that provides sufficient rigidity. If the unit is not secured properly, it can fall down and cause damage and injury.
- **Do not stack the unit directly on top of other components.**
Overheating poses a risk of fire and can lead to performance degradation of the unit.
- **Before moving the unit, turn off all equipment and disconnect the AC adapter and all other cables.**
Failure to observe this precaution can lead to damage to connected equipment.
- **Use the unit on a stable surface where it cannot fall over or be dropped.**
Dropping the unit can lead to damage.

This product conforms to EIA and DIN specifications for 19-inch rack mounting. We recommend to mount the unit in a rack rather than just placing it on a table or similar.



* Screws for rack mounting are not included with the unit.

OPERATION

**This chapter will help you get acquainted with the 1204,
showing you how to use and change effects and how to store settings.**

Operation States

The 1204 has various operation states. Basically, there are three modes and three functions.

■ Modes

- **Manual mode:** In this mode, the front-panel controls and switches of the 1204 operate as shown on the unit, letting you directly select and use effects.
- **Memory mode:** In this mode, you can choose one of 100 effect settings stored in memory. The mode also allows editing of effect parameters.
- **Recall mode:** This mode is used to return the memory settings of the unit to the factory defaults.

■ Functions

- **Store:** This function serves to store effect settings in memory.
- **Effect on/off:** This function serves to temporarily turn an effect on and off.
- **MIDI channel setting:** This function allows selection of MIDI reception channels.

Mode Selection

Normally, the unit is turned on by pressing the POWER switch without holding down any other key. This activates the manual mode. The unit can be switched later between manual mode and memory mode with the MODE key.

Turning the unit on by pressing the POWER switch while holding down the STORE key activates the recall mode. After "all memory recall" has been carried out or when the CANCEL key is pressed, the unit switches to the memory mode.

It is not possible to activate the recall mode from the manual mode or memory mode. The unit must be turned off and then turned on as described above to activate the recall mode.

■ Manual mode

In this mode, the settings as indicated by the front-panel controls are active. If for example the BANK switch is pressed and the EFFECT selector is set to 2, the FLANGER effect is active.

(In the memory mode, the setting of the front-panel controls and the active effect may not be the same.)

The manual mode allows visually checking all current settings while making adjustments. This mode is therefore most suitable for cases where parameters are to be changed in real time without frequently altering the effect selection, such as during mix-down. If effects are to be changed frequently, the memory mode is more suitable.

Effect settings adjusted in manual mode can be stored in memory. These settings can then be called up instantly using the memory mode.

■ Memory mode

The 1204 has a built-in memory that allows the user to store effects with various settings. Up to 100 settings can be stored, for easy activation at any time. To select a stored setting, the front-panel ▲▼ keys or external MIDI control signals can be used. It should be noted that selecting a setting that is stored in the memory of the 1204 makes that setting active but does not change the mechanical position of the front-panel controls. Therefore in memory mode it is possible that the front-panel controls indicate for example the FLANGER effect although the HALL effect is active.

The process of changing settings stored in memory is called editing. Editing is performed using the front-panel controls, but as described above it must be noted that the position of these controls does not have a direct relationship with the currently active settings. For details on editing, please refer to page 20.

■ Recall mode

The 1204 is shipped from the factory with 100 recommended effect settings already stored in memory. Even if the user has changed some or all of these settings, it is possible to restore the original factory settings, using the recall mode. Settings can be restored either individually or globally (all 100 memory settings together). For details on the recall mode, please refer to page 22.

Functions

Functions are certain actions or commands that can be carried out in the various modes. Depending on the mode, only certain functions are available, as listed below.

- **Manual mode:** Store function, effect on/off function
- **Memory mode:** Store function, effect on/off function, MIDI channel setting function
- **Recall mode:** Store function (as part of the recall operation)

■ Store function

This function serves to store effect settings adjusted in manual mode or memory mode into memory. Settings stored in this way can be activated instantly in memory mode.

If the store function has been completed in manual mode, the 1204 automatically switches to memory mode.

The store function as used in the recall mode differs slightly from the store function used in other modes.

■ Effect on/off function

The 1204 allows the user to quickly turn off all effects, so that only the original (DRY) sound is output. Effect on/off switching is normally performed using the EFFECT key on the front panel of the 1204, but in memory mode it can also be controlled by external MIDI equipment. For details, please refer to page 22.

Note: For reasons of simplicity, this instruction manual uses the expression "original" or "DRY" sound for the output signal that is supplied by the 1204 when the effects are switched off. However, since the 1204 converts the analog input signal into digital form for internal processing and reconverts it to analog form for output, the output signal is not exactly the same as the input signal. Audibly, there will be practically no difference, but a very slight time delay is introduced by the processing circuits. When using the 1204 in the send/return loop of a mixer, the DRY output should be turned fully down, to prevent interference (flanging) between the actual original sound and the output of the 1204.

■ MIDI channel setting function

This function can be used only in the memory mode.

The function serves to select the channels in which the 1204 receives control signals sent from external MIDI equipment.

The MIDI (Musical Instrument Digital Interface) standard allows electronic instruments and other devices to mutually control each other. The MIDI standard includes 16 control signal channels which are numbered 1 through 16. By assigning these channels in different ways, it is possible for example for one master MIDI device to control two slave MIDI devices independently.

The MIDI channel setting function allows the user to set the 1204 to receive all MIDI control channels, to activate only certain channels, or to entirely deactivate MIDI control. The selected setting is retained also when the 1204 is turned off. Normally, it is recommended to set all MIDI channels to ON.

Trying out the 1204

■ Power-on

1. **With all power switches set to OFF, connect the 1204 and all other devices.**

Caution: Set input and output level controls on all devices to minimum.

2. **Switch the devices on in the following order (for turning the power off, proceed in the opposite order):**
 - (1) Instruments or other sound source to be used as input for the 1204
 - (2) 1204 (manual mode is activated automatically)
 - (3) Playback system
3. **Adjust the level of the instrument or other sound source or the mixer send level to a suitable setting.**
4. **Adjust the INPUT control of the 1204 while playing the instrument or supplying a sound source signal. The PEAK indicator of the 1204 should light up occasionally at signal peaks.**
5. **Adjust the MIX LEVEL control of the 1204 for the desired balance between DRY and WET sound.**
6. **Adjust the OUTPUT control of the 1204 and the input level control of the playback system or mixer return input to a suitable position.**
7. **Adjust the output level control of the playback system to a suitable position.**

■ Selecting an effect

Try selecting an effect as follows.

1. **Set the EDIT1 and EDIT2 controls and the EQ LOW and EQ HIGH controls to the center position.**
Note: The MIX LEVEL control should be set to any suitable position for the system requirements.
2. **Set the PATTERN selector to "1 (DEMO)".**
Note: This setting activates a pattern recommended by ZOOM for the various effects.
3. **Use the BANK switch to select the bank (A or B) that contains the desired effect.**
4. **Turn the EFFECT selector to the position where the name of the desired effect is shown.**

The effect is now selected.

■ Selecting a pattern

Next, try selecting a pattern.

1. **Select an effect as described above.**
2. **Use the PATTERN selector to select any desired pattern.**

Note: The action of the pattern depends on which type of effect is selected. For details, please refer to the chapter "Effect Types, Effect Patterns, Effect Parameters" on page 24.

The pattern is now selected.

■ Adjusting an effect

When an effect and pattern have been selected, you can further adjust the effect to your liking.

1. **Select the effect as described above.**
2. **Select the pattern as described above.**
3. **Use the MIX LEVEL control to adjust the balance between DRY and WET sound.**
4. **Use the EQ LOW control to adjust the low-frequency boost or cut.**
Turning the control to the left (counterclockwise) attenuates the low frequencies and turning the control to the right (clockwise) emphasizes them. In the center position (pointing straight up), frequency response is flat.
5. **Use the EQ HIGH control to adjust the high-frequency boost or cut.**
Turning the control to the left (counterclockwise) attenuates the high frequencies and turning the control to the right (clockwise) emphasizes them. In the center position (pointing straight up), frequency response is flat.
6. **Use the EDIT1 and EDIT2 controls to adjust the effect parameters.**

Note: Which parameters are assigned to the EDIT1 and EDIT2 controls depends on the selected effect. For details, please refer to the chapter "Effect Types, Effect Patterns, Effect Parameters" on page 24.

The effect has now been adjusted.

Caution: The LOW and HIGH EQ controls on the front panel affect only the WET (effect) sound, not the DRY (original) sound. If the output sounds distorted although the PEAK indicator does not light up frequently, an EQ control may be set to a position which causes excessive boost. Try adjusting the control if this occurs.

■ Turning effect processing on and off

Normally, when the 1204 is turned on, effect processing is automatically enabled. This is called the "effects on" or "active" condition. In this condition, the EFFECT indicator is lit. Temporarily disabling effect processing is called the "effects off" or "inactive" condition. In this condition, the EFFECT indicator is out.

By switching between the active and inactive condition, you can easily verify the sonic character of an effect. During a performance, switching can also be used to dramatically highlight a passage.

By looking at the EFFECT indicator you can quickly tell whether effects are on or off.

Try switching between effects on and effects off as described below.

Switching effects off

1. **Verify that the EFFECT indicator is lit and the output sound is the effect sound.**
2. **Press the EFFECT key on the front panel.**
3. **The EFFECT indicator goes out and effects are off.**

Caution: When effects are off, only the DRY sound is output. Since the MIX LEVEL control operates as usual, turning it fully towards the WET position causes the output to be cut off entirely.

Switching effects on

1. **Verify that the EFFECT indicator is out and the output sound is the original sound.**
2. **Press the EFFECT key on the front panel.**
3. **The EFFECT indicator comes on and effects are on.**

■ Storing effect settings in memory

If you have followed the various steps described above, you have selected an effect and pattern and adjusted the effect sound. When you have found a setting that you like, you can easily store this setting in the memory of the 1204, so that you do not have to make the same adjustments every time you want to use this setting. The memory capacity of the 1204 is sufficient for up to 100 settings. Once a setting has been stored, it can be called up quickly, using the memory mode of the unit.

The store procedure is described below. Note that any setting stored in a certain memory number will be lost (overwritten) when another setting is stored in the same number.

1. **Adjust the effect as desired.**
 2. **Press the STORE key once. This activates the store function.**
 3. **The memory number shown on the display starts to flash. This indicates that the 1204 is in the store standby condition.**
 4. **Use the ▲ and ▼ keys to select the memory number in which you want to store the effect setting.**
- Caution: If you want to cancel the process, you can press the CANCEL key at this point. If you go ahead with the store function, any earlier setting stored in the selected memory number will be overwritten.
5. **To carry out the store function, press the STORE key once more.**
 6. **The memory number on the display flashes more rapidly.**
 7. **When the store process is completed, the memory number stops flashing and stays constantly on. The store function is now terminated.**

Note: If the store function was initiated while the 1204 was in manual mode, the unit will automatically be switched to memory mode after the store function is completed.

Store precautions

- **When wishing to store an effect setting that you have made in manual mode, be sure to initiate the store process in manual mode. If you switch to memory mode first, the setting made in manual mode will be lost.**
- **When wishing to store an effect setting that you have made (edited) in memory mode, be sure to initiate the store process in memory mode. If you switch to manual mode first, the setting edited in memory mode will be lost.**
- **In memory mode, when wishing to store an edited effect setting in a memory number other than the one currently displayed, first press the STORE key once to activate the store standby condition and then use the ▲ and ▼ keys to select the desired memory number. If you select another memory number before pressing the STORE key, the setting stored in the new number will be called up and the setting you edited earlier will be lost.**

The following items are stored in memory:

- EFFECT selector setting
- BANK switch setting
- PATTERN selector setting
- EDIT1, EDIT2 control settings (parameter settings)
- EQ LOW, EQ HIGH control settings
- MIX LEVEL control setting

The following items are not stored in memory:

- INPUT level control setting
- OUTPUT level control setting
- EFFECT ON/OFF setting
- Effect setting changes made using external MIDI equipment

■ Switching between manual mode and memory mode

The currently active mode is shown by the MODE indicator. In manual mode, the indicator is on, and in memory mode, the indicator is off.

In manual mode, all effect settings can be checked visually. This mode therefore is suitable for cases where parameters of an effect are to be fine-adjusted in real time, such as during mix-down. The mode is also suitable if you want to create a new effect from scratch.

The memory mode serves to instantly call up stored effect settings. This mode therefore is suitable for use during a performance where effects are to be switched frequently. In this mode, it is also possible to edit a setting that has been called up.

You can easily switch between the two modes as described below.

Switching from manual mode to memory mode

1. **Verify that the MODE indicator is lit.**
2. **Press the MODE key on the front panel.**
3. **The MODE indicator goes out and the unit switches to memory mode.**
The currently selected memory number appears on the display.

Switching from memory mode to manual mode

1. **Verify that the MODE indicator is out.**
2. **Press the MODE key on the front panel.**
3. **The MODE indicator comes on and the unit switches to manual mode.**
The currently selected effect type number and bank number appear on the display.

■ Calling up stored effect settings

Stored effect settings can be called up in the memory mode. Selecting a setting that is stored in the memory of the 1204 makes that setting active by electrically controlling the DSP (Digital Signal Processor) in the unit, but it does not change the mechanical position of the front-panel controls including the BANK switch. Therefore the front-panel controls may indicate a setting that is different from the actual effect setting that is active in the output.

When using the memory mode and not performing editing, the positions of the front-panel controls of the 1204 should be disregarded, except for the INPUT and OUTPUT level controls.

To call up a stored effect setting, proceed as follows.

1. **Use the MODE switch to activate the memory mode.**
2. **The currently selected memory number is shown on the display.**
3. **Use the ▲ and ▼ keys to select the desired memory number.**

Note: When wishing to change memory numbers quickly, first press the value key for the desired direction and then hold down the other value key as well. The speed with which the memory numbers change on the display will increase. When you are close to the desired memory number, release the other key to reduce the speed again.

4. **When you release the ▲ or ▼ (value) key, the setting stored in the currently displayed memory number is called up and becomes active in the output.**

Stored settings can also be called up via MIDI control. For details, please refer to page 21.

■ Editing a stored setting

The memory mode normally serves to call up effect settings stored in manual mode. However, when wishing for example to slightly alter a parameter or to change only the EQ setting of an effect and store it in another memory number, it is not necessary to switch to manual mode and start the adjustment over from the beginning. Rather, you can use the capability for editing a called-up setting in memory mode. This capability is intended mainly as an auxiliary function for making slight changes. Since the procedure is somewhat more complicated than the straightforward use of the manual mode, you should make sure that you have read and understood the explanation below before using it.

- **The setting of the front-panel controls including the BANK switch has no direct relationship to the editing process.**
- **For editing, change only the position of the required control or selector or BANK switch. Other controls should not be moved, to maintain the setting stored for those controls.**
- **Normally, the display shows the memory number, but when editing is performed, the current value appears on the display. When editing is completed, the memory number appears again. If a control or selector or BANK switch has been moved but the edited value is the same as that already stored in memory, the category indicator flashes to indicate this fact. During editing, the edit symbol is shown in the bottom right corner of the display.**
- **As opposed to manual mode, adjustments in memory mode are difficult to ascertain visually. To avoid confusion, it will normally be preferable not to change the setting of the EFFECT selector or BANK switch. When wishing to change these settings, it is best to use manual mode and perform the setting process once more.**

To edit a called-up effect setting, proceed as follows.

1. **Use the MODE key to select the memory mode.**
2. **Use the ▲ and ▼ keys to select the memory number with the settings that you want to edit.**
3. **Operate the control or selector or BANK switch whose setting you want to change. The changing value is shown on the display.**
When the edited value is the same as the value already stored in memory, the category indicator flashes.

Note: The editing range for the various controls is shown below.

- | | |
|-----------------------------|---|
| • EFFECT selector: | 1 – 16 |
| • BANK switch: | Dot in the lower center of the display (dot shown: bank A, dot not shown: bank B) |
| • PATTERN selector: | 1 – 16 |
| • EDIT1, EDIT2 controls: | (The range depends on the selected effect.) |
| • EQ LOW, EQ HIGH controls: | -12 – -1, 0, 1 – 12 |
| • MIX LEVEL control: | 0 – 99 (50 when ratio DRY:WET = 1:1) |

Caution: Performing the above steps completes the editing process. When the power is turned off, when the mode is switched, or when another memory number is selected, the edited settings will be lost. If you wish to retain the edited settings, you should perform the store function immediately after editing.

MIDI control

Note: MIDI control is possible only in memory mode.

■ MIDI channel setting function

MIDI control signals (such as program change and control change messages, see below) are always sent with a certain channel number (1 – 16). The receiving side can select which channels to receive.

MIDI control signals can be divided into several types. The 1204 can only process so-called program change messages and control change messages. Program change messages can be used by the 1204 to switch memory numbers in memory mode. Control change messages can be used by the 1204 to alter effect settings in memory mode.

In the factory default condition, the 1204 is set up to receive all MIDI channels. In MIDI terminology, this is called the "OMNI Mode On" condition. If desired, the setting can be changed as follows.

1. Use the **MODE** key to select the memory mode.
2. Press the **MIDI** key to activate the MIDI channel setting function.
The current MIDI channel setting and the indication \square "CH" flash alternately on the display.
3. Use the **▲** and **▼** keys to select the MIDI channel you want to receive.

Note: The following settings are available.

- Receive all MIDI channels: AL
- Receive individual MIDI channels: 1 – 16
- Disable MIDI channels: --

Caution: If you want to cancel the process, you can press the **CANCEL** key at this point. If you go ahead with the MIDI channel setting function, the earlier setting will be changed.

4. To complete the MIDI channel setting function, press the **MIDI** key once more. The function is terminated and the display reverts to showing the memory number. The selected MIDI channel setting is automatically stored.

Note: The MIDI channel setting is retained also when the unit is turned off.

■ Using MIDI to call up stored effect settings

Effect settings stored by the 1204 can be called up from an external MIDI device. To call up stored settings, it suffices to specify the memory number.

To call up an effect setting via MIDI, proceed as follows.

1. Connect the **MIDI OUT** jack of the external device to the **MIDI IN** jack of the 1204.
Turn all devices off before making this connection.
2. When connections are established, turn on the devices and use the **MODE** key of the 1204 to set it to the memory mode.
3. Set up the 1204 so that the MIDI receive channels match the MIDI send channels of the external device.
4. Send program change messages from the external device to switch memory numbers at the 1204.

Note: The relationship between MIDI program change messages and memory numbers of the 1204 is as shown below.

MIDI program change number	Memory number
1	01
2	02
:	:
99	99
100	00
101	/
:	
:	
128	

Program change messages over 100 are not accepted by the 1204.

■ Using MIDI to change effect parameters

The 1204 allows the use of MIDI control change messages to change effect parameters. This includes all parameters except changing the effect type (as performed with the EFFECT selector or BANK switch) and adjusting the INPUT and OUTPUT level controls. Using control change messages to change effect parameters is called real-time modulation and differs from the parameter editing process described in the previous section. When real-time modulation is used, the effect sound as heard in the output changes, but the actual effect settings are not altered. Consequently, if memory store is carried out in this condition, the same settings as before will be stored.

To change effect parameters via MIDI, proceed as follows.

1. **Connect the MIDI OUT jack of the external device to the MIDI IN jack of the 1204.**
Turn all devices off before making this connection.
2. **When connections are established, turn on the devices and use the MODE key of the 1204 to set it to the memory mode.**
3. **Set up the 1204 so that the MIDI receive channels match the MIDI send channels of the external device.**
4. **Send control change messages from the external device to change effect parameters at the 1204.**

Note: The relationship between MIDI control change messages and effect parameters of the 1204 is as shown below.

Effect parameter	MIDI control change number
PATTERN select	84
EDIT1 control	85
EDIT2 control	86
EQ LOW control	87
EQ HIGH control	88
MIX LEVEL control	8
EFFECT ON, OFF	80, 91

Recalling Factory Default Memory Settings

The 1204 is shipped from the factory with 100 recommended effect settings already stored in memory. When the user stores settings in memory, these factory defaults are overwritten, but they can be restored using the recall function. The recall mode is a special mode of the 1204 that is separate from the other two operation modes. It cannot be activated when the unit is already turned on. The unit must be turned off and then turned on by a special procedure, as described below.

In recall mode, all 100 settings can be restored together, and it is also possible to restore individual settings.

To use the recall mode, proceed as follows.

1. **Turn the unit off.**
2. **Keep the STORE key depressed while turning the unit on with the POWER switch.**
3. **The indication *AL* "AL" flashes on the display.**
4. **When wishing to restore all 100 settings together, press the STORE key once more in this condition.**
The indication on the display flashes more rapidly. When the recall process is completed, the unit automatically switches to the memory mode.
5. **When wishing to restore only a particular memory number, use the ▲ and ▼ keys to select the desired number in step 3.**
6. **When the desired memory number is displayed, press the STORE key. The indication on the display flashes more rapidly and the contents of that memory number are returned to the factory default.**
7. **Because the unit does not automatically switch to the memory mode when individual memory numbers are being restored, it is possible to restore several numbers in succession. When you wish to terminate the recall mode, press the CANCEL key. The 1204 then switches to the memory mode. Turning the unit off also terminates the recall mode.**

MENO

EFFECT TYPES, EFFECT PATTERNS, EFFECT PARAMETERS

This chapter describes the various effect types, effect patterns, and effect parameters.

■ Category: REV (Reverb)

BANK	EFFECT	PATTERN	EDIT 1	EDIT 2	COMMENT
A	1 HALL	Reverb Time = 1.0 – 3.8 Second	Diffusion	Attack	Simulates a medium-size concert hall
	2 ROOM	Reverb Time = 0.5 – 3.3 Second	Diffusion	High Cut	Simulates an acoustically dead rehearsal studio
	3 PLATE	Reverb Time = 3.0 – 9.0 Second	Pre Delay	High Multiply	Reverb with rich bass
	4 VOCAL	Reverb Time = 1.7 – 4.5 Second	Pre Delay	Attack	Reverb with a sense of depth and warmth, suitable for vocals
	5 AMBI(AMBIENCE)	Reverb Time = 0.6 – 3.4 Second	High Damp	Density	Reverb with a bright and deep character
	6 ORCHE(ORCHESTRA)	Reverb Time = 0.5 – 3.3 Second	Pre Delay	Density	Reverb with a spacious and warm character
	7 STUDIO	Reverb Time = 0.5 – 3.3 Second	Pre Delay	High cut	Simulates a large studio with high ceiling
	8 SESSION	Reverb Time = 0.6 – 3.4 Second	Diffusion	High cut	Reverb patterned on the image of a small club
	9 PERCUS(PERCUSSION)	Reverb Time = 0.6 – 3.4 Second	Diffusion	High Damp	General-type reverb suitable for all kinds of percussion
	10 DRUMS	Reverb Time = 0.5 – 3.3 Second	High Damp	Density	Warm reverb for snare drums and tom-tom
	11 SOLO	Reverb Time = 2.3 – 55 Second	Pre Delay	High cut	Reverb with pre-delay, for reed solos
	12 DLY(DELAY)	Feedback = 0 – 95 % (2 – 8 / 9 –16 same value)	Delay Time L PATTERN 1 – 8 : 0.4 – 180mS PATTERN 9 –16 : 11 – 370mS	Delay Time R PATTERN 1 – 8 : 0.4 – 180mS PATTERN 9 –16 : 11 – 370mS	Monitor the R input using the L output, for a maximum delay of 740 ms. Use EDIT1/EDIT2 controls to adjust L/R delay time.
	13 ECHO	Feedback = 0 – 95 % (2 – 8 / 9 –16 same value)	Delay Time L PATTERN 1 – 8 : 0.4 – 180mS PATTERN 9 –16 : 11 – 370mS	Delay Time R PATTERN 1 – 8 : 0.4 – 180mS PATTERN 9 –16 : 11 – 370mS	Fully separate 2-channel echo. Use EDIT1/EDIT2 controls to adjust L/R delay time.
	14 GATE	Gate Time = 88 – 1152 mS	Density	Gate Threshold	Gutsy gate reverb most suitable for snare drums
	15 POWER	Gate Time = 88 – 1152 mS	High Damp	Gate Threshold	Gate reverb with a heavy body
	16 REVERSE	Gate Time = 88 – 1152 mS	Diffusion	Gate Threshold	Reverb with an effect similar to running a tape recorder in reverse

Explanation of terms

- Diffusion: Adjusts the scope of the reverb effect.
- Attack: Emphasizes the reverb attack.
- High Cut: Attenuates the high frequencies.

- Pre Delay: Adjusts the interval between the original sound and the reverb sound.
- High Multipl: Adjusts the duration of high-frequency reverb.
- High Dam: Adjusts the speed of high-frequency attenuation.
- Densit: Adjusts the density of the reverb sound.

- Delay Time: Adjusts the interval between original sound and delay sound. The same interval is applied to multiple delay components.
- Gate Threshold: Adjusts the gate steepness.

■ Category: MOD (Modulation)

BANK	EFFECT	PATTERN	EDIT 1	EDIT 2	COMMENT
B	1 CHORUS	Modulation Depth	Modulation Delay	Modulation Frequency 0.13 – 1.39 Hz	Stereo chorus with 3 voices x 2 channels
	2 FLANGER	Modulation Frequency 0.1 – 1.9 Hz	Modulation Depth	Modulation Feedback	Flanger with wide sweep range
	3 PITCH	2 – 8 : Shift Down 1 oct Range 9 : Detune 10 – 16 : Shift Up 1 oct Range	Semi Tone Shift	Detune Width	Pitch shifter with 1-octave shift up and down When pattern is switched, pitch shift amount varies along the major scale.
	4 TREMOLO	Modulation Frequency 0.14 – 5.24 Hz	Delay Time 11 – 370 ms	Delay Feedback	Tremolo with reversed phase for L/R and delay option

Explanation of terms

- Modulation Depth: Adjusts the depth of modulation.
- Modulation Frequency: Adjusts the rate of modulation.
- Modulation Delay: Adjusts the delay until the start of modulation.
- Modulation Feedback: Adjusts the amount of modulation feedback.
- Semi Tone Shift: Shifts the pitch in semitone steps.
- Detune Width: Fine-tunes the pitch in opposite directions for L and R.
- Delay Time: Adjusts the interval between original sound and delay sound. The same interval is applied to multiple delay components.
- Delay Feedback: Adjusts the amount of delay feedback.

Pattern = 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

DRY / Input Notes

WET / Shifted Notes

detune

Pattern = 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

DRY / Input Notes

WET / Shifted Notes

detune

* Pitch Shift Intervals

■ Category: SERI (Serial)

BANK	EFFECT	PATTERN	EDIT 1	EDIT 2	COMMENT
B	5 DLY + REV	Delay Mix	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Serial connection of delay and reverb
	6 CHO + REV	Modulation Depth	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Serial connection of chorus and reverb
	7 FLG + REV	Modulation Frequency	Reverb Time 0.5 – 3.3 Second	Modulation Depth	Serial connection of flanger and reverb
	8 PIT + REV	2 – 8 : Shift Down 1 oct Range 9 : Detune 10 –16 : Shift Up 1 oct Range	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Serial connection of pitch shifter and reverb When pattern is switched, pitch shift amount varies along the major scale.

Explanation of terms

• Reverb Time: Adjusts the duration of the reverb sound.

• Reverb Mix: Adjusts the level of the reverb sound only.

■ Category: PARA (Parallel)

BANK	EFFECT	PATTERN	EDIT 1	EDIT 2	COMMENT
B	9 CHO/REV	Modulation Depth	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Parallel effect with chorus in left channel and reverb in right channel
	10 FLG/REV	Modulation Frequency	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Parallel effect with flanger in left channel and reverb in right channel
	11 PIT/REV	2 – 8 : Shift Down 1 oct Range 9 : Detune 10 –16 : Shift Up 1 oct Range	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Parallel effect with pitch shifter in left channel and reverb in right channel When pattern is switched, pitch shift amount varies along the major scale.
	12 TRM/REV	Modulation Frequency	Reverb Time 0.5 – 3.3 Second	Reverb Mix	Parallel effect with tremolo in left channel and reverb in right channel
	13 CHO/ECHO	Modulation Depth	Delay Time 11 – 370 mS	Echo Mix	Parallel effect with chorus in left channel and echo in right channel
	14 FLG/ECHO	Modulation Frequency	Delay Time 11 – 370 mS	Echo Mix	Parallel effect with flanger in left channel and echo in right channel
15 PIT/ECHO	2 – 8 : Shift Down 1 oct Range 9 : Detune 10 –16 : Shift Up 1 oct Range	Delay Time 11 – 370 mS	Echo Mix	Parallel effect with pitch shifter in left channel and echo in right channel When pattern is switched, pitch shift amount varies along the major scale.	

Explanation of terms

• Echo Mix: Adjusts the level of the echo sound only.

■ Category: SFX (Special Effects)

BANK	EFFECT	PATTERN	EDIT 1	EDIT 2	COMMENT
B	16 SFX	VOCODER / 1 – 4 : Vocoder Type	Vocoder Distortion	Sens	10-band Vocoder This effect divides the signal from a synthesizer or similar input to the left channel into 10 frequency bands and processes these channels using the signal from the MIC IN jack or the right channel input as envelope signal. Note : When wanting to use the left channel input for a microphone, the signal must first be amplified by a preamplifier (mixer or similar).
		ROTARY / 5 – 8 : Rotary Type	Horn Speed	Rotor Speed	Effect simulating a rotary speaker
		Vocal Distortion / 9 – 12 : Distortion Type	Delay Time 11 – 370 mS	Delay Mix	Distortion effect using ping-pong delay and chorus, suitable for vocals
		ZNR / 13 – 16 : ZNR Threshold	Depth - L	Depth - R	ZOOM Noise Reduction (adjustable for L and R separately)

Explanation of terms

- Vocoder Type: Changes the Vocoder character.
- Rotary Type: Adjusts the character of the rotary speaker sound.
- Distortion Type: Changes the distortion character.

- Vocoder Distortion: Adjusts the Vocoder distortion.
- Horn Speed: Adjusts the high-frequency rotation speed.
- ZNR Threshold: Adjusts the Zoom Noise Reduction threshold.

- Sens: Adjusts the Vocoder sensitivity.
- Rotor Speed: Adjusts the low-frequency rotation speed.
- Depth L/R: Adjusts the Zoom Noise Reduction depth.

* For every effect, pattern 1 is the "demo" (recommended) setting.

MEMO

IMPORTANT INFORMATION

This chapter describes troubleshooting steps and safety precautions.

Troubleshooting

If there seems to be a problem with your 1204, please check the following points first.

Symptom	Check	Remedy
No sound or volume is very low.	Is AC adapter connected correctly and is unit turned on?	Make connections as described in "Connections" and turn the unit on as described in "Power-on. "
	Is instrument connected correctly to INPUT jack and playback system to OUTPUT jack?	Make connections as described in "Connections. "
	Is shielded cable defective?	Try replacing the cable.
	Are connected instrument and playback system functioning correctly? Are all volume controls set to proper levels?	Check all devices and adjust controls.
	Are INPUT and OUTPUT level controls of 1204 set to proper levels?	Adjust controls for proper matching with connected equipment.
	Are effects set to off and is MIX LEVEL control turned towards WET?	Adjust MIX LEVEL control.
	Are EQ LOW and EQ HIGH controls turned all the way down?	Adjust EQ controls.
	Is a microphone connected to the rear-panel input? Does microphone impedance match the requirements of 1204?	Use the front-panel MIC IN jack for a microphone and use a dynamic microphone rated for 600-ohm impedance.

Symptom	Check	Remedy
Sound is distorted or breaks up.	Is input signal level too high?	Adjust INPUT level control so that PEAK indicator lights up only occasionally during signal peaks.
	Is EQ LOW or EQ HIGH control turned all the way up?	Adjust EQ controls.
Sound is different from setting of front-panel controls.	Is memory mode selected?	Use MODE key to switch to manual mode.
	Is recall mode activated?	Press CANCEL key to terminate recall mode and use MODE key to switch to manual mode.
	Are effects switched off?	Press EFFECT key to turn effects on.
Stored settings are different from established settings.	Settings were made in manual mode but unit was switched to memory mode before storing?	When mode is switched, settings are lost. Make the settings again and repeat the store process without switching modes.
	Settings were made in memory mode but unit was switched to manual mode before storing?	When mode is switched, settings are lost. Make the settings again and repeat the store process without switching modes.
	Settings were made in memory mode but memory number was changed before activating store standby condition?	When memory number is changed, settings are lost. Make the settings again and activate store standby before changing memory numbers.

Symptom	Check	Remedy
Stored settings are different from established settings.	Was editing carried out in memory mode?	The effect settings called up in memory mode have no relationship to the position of the controls on the front panel. If a setting was not edited, the original (stored) setting, not the current position of the control, is effective. Therefore the stored settings will not reflect the control positions.
	Was a setting made with MIDI control change messages?	Settings made with MIDI control change messages are only temporary and do not result in actual setting changes. If the store function is carried out, the stored contents will be the same as the original settings in memory.
Memory settings cannot be called up or memory numbers cannot be changed.	Is the unit in manual mode?	Use the MODE key to switch to memory mode.
	Is the unit in recall mode?	Press the CANCEL key to switch to memory mode.
	Are effects switched off?	Press EFFECT key to turn effects on.
	Is the store function active?	Press the STORE key or CANCEL key to terminate the store function.
	Is the MIDI channel setting function active?	Press the MIDI key or CANCEL key to terminate the function.

Symptom	Check	Remedy
Control via MIDI cannot be carried out.	Is the unit in manual mode?	Use the MODE key to switch to memory mode.
	Is the unit in recall mode?	Press the CANCEL key to switch to memory mode.
	Does the MIDI channel setting match the send channel?	Set up the 1204 to receive the required channels, using the MIDI channel setting function.
	Are messages other than control change messages and program change messages being sent?	Other MIDI messages such as "Note On," "System Exclusive Data," "Start/Stop," "NRPN," etc. are ignored.
	Are program change numbers and control change numbers correct?	For information about numbers, refer to the MIDI implementation.
	Is the store function active?	Press the STORE key or CANCEL key to terminate the store function.
	Is the MIDI channel setting function active?	Press the MIDI key or CANCEL key to terminate the function.
	Is the MIDI OUT jack of the other device connected correctly to the MID IN jack of the 1204?	Make connections as described in "Connections."

Usage Precautions

■ Electrical interference

For safety considerations, the 1204 has been designed to provide maximum protection against the emission of electromagnetic radiation from inside the device, and from external interference. However, equipment that is very susceptible to interference or that emits powerful electromagnetic waves should not be placed near the 1204, as the possibility of interference cannot be ruled out entirely.

Whatever the type of digital control device, the 1204 included, electromagnetic damage can cause malfunctioning, and can corrupt or destroy data. Since this is an ever-present danger, thorough care should be taken to minimize the risk of damage.

■ Cleaning

Use a soft, dry cloth to clean the 1204. If necessary, slightly moisten the cloth. Do not use abrasive cleanser, wax, or solvents (such as paint thinner or cleaning alcohol), since these may dull the finish or damage the surface.

Please keep this manual in a convenient place for future reference.

MEMO

Specifications

ZOOM STUDIO 1204

- **Number of preset programs:** 512 (16 effects x 2 banks x 16 patterns)
- **Program memory capacity:** 100 settings (overwrite and store)
612 programs
- **A/D converter:** 18 bit, 128 times oversampling
- **D/A converter:** 18 bit, 128 times oversampling
- **Sampling frequency:** 44.1 kHz
- **Frequency response:** 10 Hz – 20 kHz
- **Inputs**
 - Rear inputs (L/MONO, R): standard monaural phone jack x 2
Reference input level: -10 dBm to +4 dBm
Input impedance: 10 kilohms (MONO), 20 kilohms (STEREO)
 - MIC input: standard monaural phone jack x 1
Reference input level: -56 dBm to -36 dBm
Input impedance: 10 kilohms
- **Outputs**
 - Rear outputs (L, R): standard monaural phone jack x 2
Reference output level: -10 dBm to +4 dBm
Input impedance: 2 kilohms or less
- **Control connector:** MIDI IN
- **Power requirements:** 9 V DC, 300 mA (from supplied AC adapter)
- **Dimensions:** 482 (W) x 44 (H) x 115 (D) mm
- **Weight:** 1.5 kg

* 0 dBV = 0.775 Vrms

* Design and specifications subject to change without notice.

1204 MIDI IMPLEMENTATION

1. TRANSMITTED DATA

NONE

2. RECOGNIZED DATA

1) CHANNEL VOICE MESSAGES

STATUS	SECOND	THIRD	DESCRIPTION
1011 nnnn	0ccc cccc	0vvv vvvv	CONTROL CHANGE nnnn : MIDI Channel No.(0000 ~ 1111) ccc cccc : Control No. (See Table 1) vvv vvvv : Control Value (See Table 1)
1100 nnnn	0ppp pppp	---- ----	PROGRAM CHANGE nnnn : MIDI Channel No.(0000 ~ 1111) ppp pppp : Program No.(000 0000 ~ 110 0011)

Table 1.

Parameter	Control No.	Control Value.
Effect Pattern	84	0 ~ 127
Edit 1	85	0 ~ 127
Edit 2	86	0 ~ 127
EQ Low	87	0 ~ 127
EQ High	88	0 ~ 127
Mix Level	8	0 ~ 127
Effect ON/OFF	80,91	0 ~ 63=ON / 64 ~ 127=OFF



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