MS-02 OWNER ‘s MANUAL

1) Introduction

"For complete connection compatibility between synthesizers.
The MS-02 is ideal if you want to upgrade your synthesizer by adding on other synthesizer units having different kinds of keyboard control voltage and trigger signals. The built-in, fully adjustable log amp, anti-log amp, and trigger processor ensure complete system flexibility and compatibility between any presently voltage controlled synthesizer."

Thank you for choosing Korg equipment. In order to get the most out of your new MS-02, please read this owner's manual carefully before use.

The Korg Interface MS-02 is designed for the purpose of connecting Korg MS-Series synthesizers with other synthesizers available throughout the world. This sophisticated signal processor greatly enhances the performance possibilities of the MS-Series.

Among presently available music synthesizers, there are two different types of control system used for the VCO (voltage controlled oscillator) and EG (envelope generator). One of these systems is used by Korg and Yamaha; the other is employed by every other synthesizer manufacturer. The Korg MS-02 provides you with a way to change the control signals of one system into the control signals used in the other system. In this way, it acts as an interface so that any two synthesizers can be used together, provided that the synthesizers are equipped with the conventional input and output jacks for control voltage and trigger or gate signals.

2) Advantages of the Korg system

In the Korg Hz/V system, the VCO oscillator frequency is proportional to the control voltage. Other synthesizers employ the OCT/V system, in which the oscillator frequency changes one octave for every one volt (1V) change in the control voltage. Since an increase of one octave means that the frequency is doubled, each increase of one volt in the control voltage means a doubling of VCO frequency.

The problem with the OCT/V system, used by every manufacturer except Korg and Yamaha, is that it must employ a log amp in order to double the frequency for each one volt increase in the control voltage. Log amp circuitry is unfortunately very unstable because of its sensitivity to temperature changes. This causes so many problems that most professional musicians automatically assume that synthesizers always have unstable pitch. When we developed out first Korg synthesizer, we decided that such a circuit was entirely

unsuitable for a musical instrument. So, instead we invented our own unique, patented circuit in which the keyboard voltage (which is the VCO control voltage) itself doubles for each one octave increase in pitch.

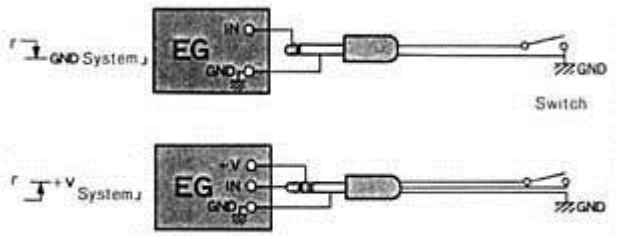
EG control is also simplified in the Korg system.
For the trigger signal (also called a "gate" signal) that is used to start EG operation, Korg uses a simple switch and 2p phone plug connection instead of the special plugs and switches needed for the " +V" type of system.
The " GND" type of system used by Korg also makes it easy to use microcomputers to control the synthesizer.

- Specific differences between the two systems

  The graph in Figure 1 below shows the relationship between the VCO oscillator frequency (pitch) and the control voltage (keyboard output voltage). The straight line on the graph is from a synthesizer in which there is a one octave change for every one volt change in the control voltage. In other words, a one volt rise in voltage produces a one octave rise in pitch (OCT/V system).

  In contrast, the curved line on the graph is the control voltage from the keyboard of a Korg or Yamaha synthesizer in which VCO frequency is proportional to voltage (Hz/V system). Note that the voltage doubles for each octave rise in pitch. The difference between the trigger (gate) signals of the two systems is clearest if you think of the trigger as a switch. In the lower diagram below is shown the Korg system (GND) of switching on EG operation (initiating operation), and the means by which the other system (+V) accomplishes the same thing. In the (GND) system, only two lines are needed to connect the switch to the EG. In the (+V) system, either three lines, or the addition of a battery to the switch is required.

FIGURE
- logarithmic versus linear cv systems



- trigger types

---

3) Features and Functions

FIGURE
- guide to features and functions

① Log Amp:
This changes a Hz/V type keyboard CV (control voltage) output into an OCT/V type of CV. Use the Log Amp to change the control signal from a Korg or Yamaha synthesizer into a signal you can use with another type of synthesizer.

② Antilog Amp:
This changes an OCT/V type of keyboard CV output into a Hz/V type of CV. Use this Antilog Amp when you want to control a Korg synthesizer by means of a unit that uses the OCT/V system.

③ Adding Amp:
This can be used for mixing control voltage signals or sound signals.
When not plugged into an outlet, the adding amp operates as if -5V and +5V inputs were connected to its two channels. Therefore, depending on how you set up your equipment, you can also use the adding amp as a voltage supply, or to shift a control voltage to a higher or lower value, and so forth.

④ Trigger Processor:
This lets you change either type of trigger signals (⊐ GND or ⊐ +V) into the kind of trigger signal you need by means of the Reverse switch.

⑤ Junctions:
These are additional jacks for simultaneous control of a number of synthesizer units or modules (VCO, VCF, VCA, EG, MG, etc.).

Using the keyboard of a Hz/V type synthesizer to simultaneously play (control) an OCT/V type synthesizer ^

FIGURE
- Hz/V to OCT/V conversion

(1) Connect synthesizer A (Hz/V) and synthesizer B (OCT/V) as shown by the solid lines.
(2) Set the octave (scale) selectors on both synthesizers to 8' and set the tuning knobs to the center position.
(3) While playing the lowest note on the A keyboard, use the MS-02 Log Amp Frequency knob and the synthesizer B tuning knobs to match the pitch of B with that of A.

- If you cannot get the same pitch by this method, change the connections to those shown by the dotted lines. Turn the Adding Amp Ch-2 level knob to the central x1 position and then slowly raise the Ch-1 knob. This will greatly increase the pitch of synthesizer B. If you need to lower the pitch of B, change the Adding Amp connection from the Ch-2 input jack to the Ch-1 input jack. Then set the Ch-1 level to x1 and adjust the pitch with the Ch-2 level knob.

(4) While playing the highest note on the A keyboard, adjust the Log Amp Width knob so that the pitch of B matches the pitch of A.

- If you are using the Adding Amp and you can't get the pitch of B to match that of A, use the knob you set to x1 to roughly readjust the pitch.

(5) Repeat steps (3) and (4) as necessary until the scales of synthesizers A and B are perfectly matched.

Using the keyboard of a OCT/V type synthesizer to simultaneously play (control) an Hz/V type synthesizer ^

FIGURE
- OCT/V to Hz/V conversion

(1) Connect synthesizer A (OCT/V) and synthesizer B (Hz/V) as shown by the solid lines.
(2) Set the octave (scale) selectors on both synthesizers to 8' and set the tuning knobs to the center position.
(3) While playing the lowest note on the keyboard of synthesizer A, (the note that produces a CV OUT voltage of 0V) adjust the MS-02 Anti Log Amp Frequency knob and set the synthesizer B tuning knobs so that the pitch of B matches that of A.

- If you cannot get the same pitch by this method, change the connections to those shown by the dotted lines. Make sure that the Adding Amp Ch-2 level knob is set to "0". Then perform rough pitch adjustment using the Ch-1 level knob.

(4) While playing the highest note on the keyboard of synthesizer A, (the note that produces the highest absolute value of the CV OUT voltage) use the Anti Log Amp Width knob to adjust the pitch of B so that it matches the pitch of A.
(5) Repeat steps (3) and (4) as necessary until the scales of A and B are perfectly matched.

Using Sq-10 to control a synthesizer having ⊐ +V type trigger (gate) signals ^

FIGURE
- using the SQ-10 to control a synthesizer having positive trigger signals

If you employ the trigger processor on the MS-02, you can use the Korg SQ-10 Analog Sequencer for automatic control of any brand of synthesizer equipped with VCO CV IN and EG TRIGGER IN input jacks. The figure above shows one example of how to connect the three units.

Using the MS-02 for rough pitch adjustment between two Hz/V type synthesizers ^

FIGURE
- using the MS-02 for rough pitch adjustment between two Hz/V type synthesizers

(1) Connect synthesizers A and B as shown in the figure above.
(2) Set the controls on both synthesizers so that the octave (scale) selectors are at 8' and the tuning knobs are set at the center position.
(3) While playing a note in the middle of the keyboard of synthesizer A, adjust the MS-02 Adding Amp Ch-1 level knob so that the pitch of B is the same as the pitch of A. For fine adjustment, use the tuning knobs on synthesizer B.
Note: Be sure that the Adding Amp's Ch-2 level knob is set at the "0" position.

Using the MS-02 for rough pitch adjustment when playing two Hz/V type synthesizers from one keyboard ^

Use the setting in figure a to lower the pitch of synthesizer B; to raise the pitch of synthesizer B, follow figure b when making connections.

- a] rough pitch adjustment between two Hz/V type synthesizers from one keyboard (lowering pitch)

•Lowering pitch: [figure a]

(1) While playing the lowest note on the keyboard (the note that produces 0V CV OUT voltage) of synthesizer A, adjust the Adding Amp Ch-2 level knob so that the pitch of synthesizer B matches that of A.
(2) While playing the highest note on the keyboard of A (the note that produces the highest CV OUT voltage), use the Adding Amp Ch-1 level knob to fine tune the pitch of synthesizer B so that it matches A.
(3) Repeat steps (1) and (2) as necessary until the scales are matched.

FIGURE
- b] rough pitch adjustment between two Hz/V type synthesizers from one keyboard (raising pitch)

•Raising pitch: [figure b]

(1) While playing the lowest note on the keyboard of synthesizer A (the note that produces a CV OUT voltage of 0V), use the Adding Amp Ch-1 level knob to adjust the pitch of synthesizer B so that it matches A.
(2) While playing the highest note on the keyboard of A (the note that produces the highest CV OUT voltage), use the Adding Amp Ch-2 level knob to fine tune the pitch of synthesizer B so that it matches A.
(3) Repeat steps (1) and (2) as necessary.

Using the MS-02 as a modulation input for pitch bend and vibrato effects with an external control unit ^

FIGURE
- modulation inputs for pitch bend and vibrato effects

•Hz/V system *[left side of figure]*

(1) Connect the Hz/V type synthesizer and MS-02 as shown in the diagram on the left of figure 6.
(2) Set the Log Amp controls as shown on the diagram. Set the Adding Amp Ch-2 level knob to "0".
(3) Play the lowest note on the synthesizer keyboard and use the Adding Amp Ch-1 level knob and the Anti Log Amp Frequency knob to adjust the pitch to match some accurate reference
(4) Play the highest note on the keyboard and use the Anti Log Amp Width knob to adjust the pitch to match a reference tone, as in step (3).

(5) Repeat steps (3) and (4) as necessary.
(6) Use the Adding Amp Ch-2 level knob to adjust the strength of the effect you get when you operate the external control unit.

- OCT/V system *[right side of figure]*

(1) Connect the OCT/V type synthesizer and MS-02 as shown in the diagram.
(2) Play the lowest note on the keyboard (the note that produces a CV OUT voltage of 0V) and use the tuning knobs on the synthesizer to adjust the pitch to match an accurate reference
(3) Play the highest note on the synthesizer keyboard (the note that produces the highest CV OUT voltage) and use the Adding Amp Ch-1 level knob and the Anti Log Amp Frequency knob to adjust the pitch to match your reference tone.
(4) Use the Adding Amp Ch-2 level knob to adjust the effect you get when you operate the external control unit.

---

6) Caution

(1) Before using the Log Amp or Anti Log Amp sections, turn on the MS-02 and let it warm up for about 10 minutes.
(2) Since the MS-02 output may be affected by ambient temperature changes, avoid using near heating or cooling units.

---

6) For more accurate tuning

For the most precise tuning results when using the MS-02 Log Amp and Anti Log Amp, we recommend the Korg Tuning Standard WT-10A.
The WT-10A employs a meter to tell you at a glance whether pitch is accurate or not.

The Korg WT-10A tuner

Specifications ^

1. LOG AMPLIFIER
   - Tuning
   - Width
   - Hz/V input (0~15V)
   - Oct/V Output (-12V~+12V)
2. ANTILOG AMPLIFIER
   - Tuning
   - Width
   - Oct/V input (-4V~+4V)
   - Hz/V output (-12V~+12V)

3. ADDING AMPLIFIER	• Channel 1 level control • Channel 2 level control • Input Channel 1 • Input Channel 2 • Output
4. TRIGGER PROCESSORS x 2	• Trigger indicator • Reverse switch • Input (Vth=+2.5V) • Output (0V~+15V)
5. OTHERS	• Power switch • Pilot lamp
6. JUNCTIONS	• 4 x 2 • 3 x 1
7. DIMENSIONS	• 283 (W) X 110 (H) X 195 (D) mm
8. WEIGHT	• 2.2kg
9. POWER CONSUMPTION	• Voltage (local voltage, 50/60Hz), wattage (5W)