HG-30 Quick mode setup

Mode connections and adjustments are listed shortly for each mode in the following. For more detailed instructions, please read the longer mode sections in the manual. Check the latest from www.audiospektri.com. Also note that instead of the proposed external envelope generator outputs below, the **D.C.out** voltage from the front panel plug can be connected to all the envelope inputs, if you just want to keep the corresponding control voltage constant. If left unconnected, several modes will not output any signal. Always first connect a patch cable to an input, and only after that to an output, in order to prevent shorts. Remember the virtual switchboard instructions: on power up, all sliders are connected to envelope input 1, and only if you toggle the switch to the "envelope select" position and back again, the previously stored connections are activated. Study the section "switchboard" for storing non-default linkage between the inputs and the sliders.

Mode 0, **30 harmonics**

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders.
2. If you want to use the noise and/or PM modulation features, connect also envelope generator outputs to **modulation 1** and/or **modulation 2**.
3. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

- Noise modulation strength using **adjust 1**.
- Phase modulation strength using **adjust 2**.

Mode 1, 15 harmonics, individual modulation control

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders. Only 15 harmonic sliders used in this mode.
2. If you want to use the noise and/or PM modulation features, connect also envelope generator outputs to **modulation 1** and/or **modulation 2**.
3. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

- Noise modulation strength using **adjust 1**.
- Phase modulation strength using **adjust 2**.
- Use sliders 16 – 30 to individually adjust the noise/PM modulation for the corresponding harmonics 1 – 15.

Mode 2, comb filtered noise

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders. Only sliders 1 to 18 are usable in this mode, keep the sliders 19 – 29 at minimum.
2. If you want to have the noise modulation function, connect also envelope generator output to **modulation 1**.
3. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

– Adjust noise modulation strength using **adjust 2.**
– Adjust comb filter feedback using **adjust 1.** This effectively determines the noise level.
– When Slider 30 is fully down, increasing modulation amplitude increases the noise level, and when Slider 30 is up, increasing modulation amplitude decreases the noise level.

Mode 3, 7 intervals x 15 harmonics

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have selected for the desired sliders using the virtual switchboard. Note that both the 15 harmonics (sliders 1 to 15) and the 7 interval amplitude responses (sliders 16 to 22) can be modulated.
2. Use sliders 23 – 26 to select the key to be played, using table 1 to define the correct one.
3. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

– No function for **adjust 1, adjust 2, modulation 1,** nor **modulation 2**.

Mode 4, Pseudo-VCF with noise control, Mode 13: Pseudo-VCF with PM control

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders 1 – 15, and for the filter amplitude sliders 16 – 27.
2. Connect envelope generator output to **modulation 2** to do the center frequency modulation of the pseudofilters.
3. If you want to use the noise features (Mode 4), or PM (Mode 13), connect also envelope generator output to **modulation 1.**
4. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

– Use **adjust 2** to control of the pseudofilter center frequency modulation sensitivity.
– Use **adjust 1** set the modulation level for noise (Mode 4) or PM (Mode 13).
– Use Sliders 1 -15 to set the harmonic spectra.
– Use Sliders 16 – 27 to set the pseudofilter spectral response.
– Use Sliders 28, 29 and 30 to select the noise or PM modulation strength selectively to three harmonic ranges (1&2; 3-5; and 6 – 15 correspondingly).

Mode 5, True chorus with 10 chorus members, each having maximum of 19 harmonics. Also possibility to generate non-harmonic overtones.

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders 1 – 20.
2. Correspondingly, Connect envelope generator outputs to to all those of the **envelope inputs** you have activated for sliders 21 - 30 to control the chorus member amplitudes.
3. Connect an envelope output to **modulation 1** if you want to activate/modulate the frequency deviation between the chorus members. Modulation 2 has no function
4. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

– Set the chorus member spectra by sliders 1-19 (all members have identical spectra) and relative chorus member amplitudes using sliders 21-30.
– Use **adjust 1** to control the sensitivity to the signal at **modulation 1**.
– Use **adjust 2** to shift the overtones out of harmony, if desired.

Mode 10, 30 harmonics with two parameter noise control , Mode 11: 15 harmonics with individual two parameter noise control.

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired harmonic sliders.
2. Connect envelope generator outputs to **modulation 1** and **modulation 2**.
3. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.
– **modulation 1** is used for modulating the setting of **adjust 1**.
– **modulation 2** is used for modulating the setting of **adjust 2** .
– **adjust 1** and **adjust 2** are both used for noise adjustment. **adjust 1** controls the noise amplitude, and **adjust 2** the noise injection period.
– Mode 10 has identical control for all the 30 harmonics, while Mode 11 has individually adjustable strength for the 15 harmonics using sliders 16 – 30.

Mode 12, Harmonic generator with built-in sequenced envelope generator

1. Connect external envelope generator output to **modulation 2** (but it has no adjustment, its amplitude directly makes the PM modulation, so use a well adjustable external generator or leave open for no PM).
2. Use the virtual switchboard to link the 30 harmonics to one of the **envelope inputs 1 – 8** to determine their internal envelope trigger delay.
3. Turn **gate on**, now the Eurorack note gate signal triggers the internal envelope generators.
4. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.
– use **adjust 1** to control the envelope shape (see Figure 4)
– use **adjust 2** to control the envelope duration and relative delays between the 8 possible events.

Mode 14, Frequency modulated harmonic generator.

1. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the desired base note harmonic sliders. Only 10 harmonics are used in this mode, i.e. sliders 1 to 10 are usable for the base signal spectrum setting. Remember that on power up, all are connected to **envelope input 1**, and only if you toggle the switch to **envelope select** position and back again, the previously stored connections are activated.
2. For modulating signal harmonic amplitude control, connect envelope generator outputs to those **envelope inputs** that you have linked for the sliders 21 -28. Adjust sliders 21 – 28 to set the relative amplitudes for each of the modulator harmonics.
3. Connect envelope generator outputs to all those of the **envelope inputs** that you have activated for the individual harmonic frequency modulating signal amplitude defining sliders 11 - 20. Check the correspondence of sliders 1 – 10 and 11 – 20.
4. For modulating signal frequency control, connect an envelope generator output to **modulation 1** and adjust the modulation offset frequency to a desired level using **adjust 1,** and gain using **adjust 2.**
5. Define downward or upward modulation by setting slider 30 down or up, correspondingly.
6. Connect global modulation amplitude control envelope to **modulation 2**.
7. Use slider 29 to remove (slider off) or allow (slider up) possible aliased, folded frequencies.
8. Optionally, connect the **CV pitch** and **CV velocity** inputs to the corresponding MIDI input module outputs.

The vocoder modes 6-9

Mode 6: Single channel vocoder

Input signals:
      modulation 1: No function
      mic: Microphone input, balanced 3.5mm TRS plug
      modulation 2: No function

envelope inputs:
      envelope 1: Amplitude modulation
      envelope 2: N.C.
      envelope 3: Spectral shift modulation
      envelope 4: N.C.
      envelope 5: Noise modulation
      envelopes 6-8: N.C.

      Notes: A vocoder is typically used without external envelope modulation; in that case connect all the envelope inputs 1,3, and 5 to the **D.C. out** output for enabling the corresponding functions.

Outputs:
      Output is normally from the **out** TRS jack.

Adjustments:
      adjust 1: spectral shift ("big speaker"/"small speaker" effect)

      Slider 1: On/off, automatic/manual noise control. If off, or fully down, the noise characteristics can be adjusted using sliders 2 - 5, otherwise an automatic noisiness decision is made in the vocoder.

      Slider 2: If Slider 1 is off, adjusts the noise level at the frequency band corresponding to the fundamental,   otherwise it adjusts the sensitivity for automatic noise generation for the fundamental. Note that **envelope** 5 modulation only works in the manual mode.

      Slider 3: Corresponding noise adjustment for harmonics 2&3.

      Slider 4: Corresponding noise adjustment for harmonics 4&5.

      Slider 5: Corresponding noise adjustment for all the remaining harmonics.

      Slider 6: Noise gate: clips the bottom of the analyzed speech spectrum which typically is noisy; increased clipping also removes lower spectral contents for possibly desired sound coloring.

      Slider 7: Temporal control of spectral variations: if off, very slow response like in legacy

analog vocoders, typically keep at maximum for rapid response.

Slider 8: Spectral shaping; exaggerates the differences of spectral peaks and valleys when s hifted upwards from the off-position. Keep off if you are happy with the original spectrum envelope.

Sliders 9 - 11: Control of the interpolation between the analyzed spectral bands. These are all on-off controls and their change only comes into effect after system reset or mode change. When all sliders 9 - 11 are off at the minimum position, the interpolation is maximally smooth. Pulling higher sliders up improves step by step the spectral resolution. Note that always the highest number slider defines the interpolation, lower ones do not have meaning if a higher one is up from the off position. **Slider 11** activates the steepest, almost brick-wall interpolation.

Sliders 29 and 30: Microphone digitizer noise gate. In addition to the spectral noise gate adjustment with Slider 6, also the input microphone A/D has noise gating. The default gating from system reset can be varied using these sliders. If you want to increase the gating threshold, move Slider 29 to the maximum position and move Slider 30 up and down between the minimum and maximum positions. Each sweep up or down increases the threshold by 3dB. Correspondingly, when Slider 29 is at the minimum position, each sweep decreases it by -3dB. Overload led blinking shows reaching of the minimum or maximum threshold.

Mode 7: Single channel freeze spectrum/capture transient vocoder

Mode 7 has three different operations:

1. Freeze spectrum: When turning the mode selector either from Mode 6 or Mode 8 to Mode 7, the instantaneous spectrum is frozen and can then be played and modified using mostly the same controls as in Mode 6.
2. Transient capture: a duration of 1.1 seconds of the input signal can be captured, vocoded, and then played back using the live vocoder controls, and additionally with variable playback speed.
3. Some typical vocal and special effect transients are stored in the non-volatile memory and can be played readily.

In this mode, the controls and **envelope input** functions are equal to the ones in Mode 6, with three exceptions:

1. The replay speed is controlled using sliders 12 and 13. When **Slider 12** is off (= fully down), raising **Slider 13** will slow down the replay, and when **Slider 12** is not off, raising **Slider 13** will speed up the replay. As you can hear, because in the vocoder the sound parameters are isolated, the replay speed does not change either the pitch or the spectral envelope (as would be the case if the raw original sound sample would be played back).
2. **Slider 1** is used for controlling the capture and storage operations. Thereby the automatic/manual noise control stays only manual in this mode.
3. **Envelope input 8** is used for determining if a stored transient is played or a new transient is captured.

The following instructions explain the three use cases:

1. **Freeze spectrum**: If you want to freeze a spectrum coming from Mode 6 or 8, then keep Slider 1 at the middle position. Sing a desired vowel continuously while simultaneously switching the mode selector from 6 or 8 to 7. Now the spectrum at the switching moment will be frozen and you can continue playing in the same way as in Mode 6 (except that no microphone is needed any more). Leave e**nvelope input 8** open or grounded.

2. **Transient capture**: Keep the three position toggle switch in the middle position (**gate off**) and leave e**nvelope input 8** open or grounded. Then move Slider 1 to its lowest position. Now the vocoder works in the real time mode, as explained in Mode 6, and you can listen to the signal from the output jack. The transient capture starts when raising Slider 1 upwards. The distance from the "off" position now determines the capture sensitivity.
Playing the transient needs to have the toggle switch returned in the **gate on** position, so that each keyboard key activation starts the transient.

3. **Stored vocoder transient playback**: The vocoder has 26 fixed transients stored in the nonvolatile memory, containing both human voice and musical instrument spectra. These are 1.1s each. Reading the transients is done in the following way:

Keep the toggle switch in the **gate on** position. Connect e**nvelope input 8** to **D.C. Out**. Now rotating **adjust 1** CW causes the transients toggle one item forward each time the gate signal rises, i.e. when any keyboard key is pressed. Correspondingly rotating it CCW toggles them backward. The overload led blinks when either the maximum or minimum is reached. The rotated angle is irrelevant, always the next transient in list is found for one key activation. When you have found a suitable one, keep **slider 1** up, disconnect e**nvelope input 8** and play the sample. Now **adjust 1** comes back to its default function, i.e. big singer/small singer adjustment. Use sliders **12** and **13** to control the playback speed as described above. The list of stored transient is shown in the manual.

Mode 8: Two channel vocoder

Input signals:
    modulation 1: No function
    mic: Microphone input, balanced 3.5mm TRS plug
    modulation 2: No function

envelope inputs:
    envelope 1: base note amplitude modulation
    envelope 2: 2nd note amplitude modulation
    envelope 3: base note spectral shift
    envelope 4: 2nd note spectral shift
    envelope 5: Noise modulation

Notes: Vocoder is typically used without external envelope modulation; in that case connect all the **envelope inputs** 1 - 5 to the **D.C. out** output for enabling the corresponding functions.

Outputs:
Output is normally from the **out** TRS jack.

Adjustments:
 adjust 1: spectral shift for base note (big speaker/small speaker)
 adjust 2: spectral shift for second note (big speaker/small speaker)

Slider 1: On/off, automatic/manual noise control. If off, or fully down, the noise characteristics can be adjusted using sliders 2 - 5, otherwise automatic noisiness decision made in the vocoder.

Slider 2: If Slider 1 is off, adjusts the noise level at the frequency band corresponding to the fundamental, otherwise adjusts the sensitivity for automatic noise generation for the band. Note that **envelope** 5 modulation only works in the manual mode.

Slider 3: Corresponding noise adjustment for harmonics 2&3.

Slider 4: Corresponding noise adjustment for harmonics 4&5.

Slider 5: Corresponding noise adjustment for all the remaining harmonics.

Slider 6: Noise gate: clips the bottom of the analyzed speech spectrum which typically is noisy; increased clipping also removes lower spectral contents for sound coloring.

Slider 7: Temporal control of spectral variations: if off, very slow response like in legacy analog vocoders, typically can be kept at maximum for rapid response.

Slider 8: Spectral shaping; exaggerates the differences of spectral peaks and valleys when shifted upwards from the default off-position.

Sliders 9 - 11: Control of the interpolation between the analyzed spectral bands. These are all on-off controls and their change only comes into effect after system reset or mode change. When all sliders 9 - 11 are off at the minimum position, the interpolation is maximally smooth. This results in decreased spectral resolution, but minimizes possibly unwanted effects with rapid note changes that vary the spectrum. Pulling higher sliders up improves step by step the spectral resolution. Note that always the highest number slider defines the interpolation, lower ones do not have meaning if any higher one is up from the off position. Slider 11 activates the steepest, almost brick-wall interpolation.

Sliders 16 to 22 define the pitch difference between the two vocoder output channels or notes. When all are off, the difference is zero. The intervals follow logically the second number below the slider, i.e. Slider 17 (with number 2 below it) activates the second interval, next the third, and so on, up to the seventh at Slider 22 (or 7 below it). Sliders 17 - 22 have on/off function,

and always the higher numbered raised up   determines the interval, regardless of any of the lower ones. In contrast, Slider 16 (or 1 in the lower numbers) has continuous adjustment with a maximum of a little over one semitone, and it works with any of the sliders 17 -22. For correct nominal key intervals, keep slider 16 off. These sliders also control the relative amplitude difference between the two voices.

Sliders 23 - 26 determine the key followed by the interval sliders 17-22. These have on/off f unction, now   used as binary coders with 23 as the least significant and 26 most significant bit. When all are off, the key is C major/A minor, when only 23 is raised, the key is B major/Gsharp minor, when only 24 raised, B flat major/G minor, etc. See the Table 1 for all the codes corresponding to the keys.

Sliders 29 and 30: Microphone digitiser noise gate. In addition to the spectral noise gate adjustment with Slider 6, also the input microphone A/D has noise gating. If you want to increase the gating threshold, move Slider 29 to the maximum position and move 30 up and down between the minimum and maximum positions. Each sweep up or down increases the threshold by 3dB. Correspondingly, when Slider 29 is at the minimum position, each sweep decreases it by -3dB. Overload led blinking shows reaching of the minimum or maximum threshold.

Table 1: The keys selection coding using Sliders 23-26 in on/off mode, applies to modes 3,8, and 9

Key	Slider 26	Slider 25	Slider 24	Slider 23
C major/A minor	off	off	off	off
C# major/Bb minor	off	off	off	on
D major/B minor	off	off	on	off
D# major/C minor	off	off	on	on
E major/C# minor	off	on	off	off
F major/D minor	off	on	off	on
F# major/D# minor	off	on	on	off
G major/E minor	off	on	on	on
G# major/F minor	on	off	off	off
A major/F# minor	on	off	off	on
Bb major/G minor	on	off	on	off
B major/G# minor	on	off	on	on

Mode 9: Two channel freeze spectrum/capture transient vocoder

Mode 9 is similar to Mode 7 for the dual channel vocoder case, so please follow its instructions for use of **Slider 1, Slider 12, Slider 13, envelope input 8**, and the toggle switch, and otherwise follow Mode 8 instructions.