A-100
Analog Modular System

DOEPFER

www.doepfer.com
A-100 is a Modular Analog Synthesizer System built in the style of the big modular systems of the seventies.
The renaissance of analog synthesizers in the last few years shows that analog sound generation has its qualification besides sampling and digital synthesis and creates sounds that are available in no other way. In addition to the specific sound of analog oscillators and filters, this system offers manifold ways of modulations, not being restricted to conventional types.
In a modular system there is no inherent difference between modulation and sound sources. For instance, the frequency of an oscillator or filter may be modulated “slowly” with a low frequency oscillator in the usual manner or “fast” with another audio oscillator to produce non-harmonic FM sounds. Moreover, a modular system offers an enormous variety of interconnections between the modules, almost without restrictions - provided that enough modules are available.
Of course, a modular system doesn’t just have advantages. Creative work with an audio construction kit like this takes time and practice, especially to start with. Anyone who wants to be able to check out all its available sounds at the press of a button will be very disappointed with a modular system. Each unique sound has to be puzzled out, and may never be exactly repeated. Nor are there any fixed rules for connecting the various modules. A modular system is an open system, in which practically anything is possible, and that’s where the fun really starts. Diversity and experimentation - and sometimes lateral thinking - are the keys to its power. Although the user manuals for each module are very comprehensive, they can’t substitute entirely for a general overview and knowledge of analog synthesis. Some very good specialised books have been written on the subject (e.g. Allen Strange, Electronic music - systems, techniques and controls, W.C.Brown Company Publishers, Iowa, ISBN 0-697-03602-2), and although some may be out of print, it’s crucial to find one or two of them, and learn from them. With that, the whole world of modular systems will open up to you, and you’ll suddenly appreciate their fascination and sheer sonic power.

But even if you have a lot of time, you should acquire some theoretical previous knowledge. However, if you have cleared all these hurdles, the fascinating world of a modular system will appear to you, and you will understand the musical attraction of analog sound synthesis very soon.
Of course we hope that these remarks will not get you off the A-100. But we think that some clarifying words in advance are better than dissatisfied customers, being left in the dark about a product.
At this point we also hope for your understanding that the low prices of the A-100 modules cannot include a detailed personal guidance in analog sound synthesis with modular systems or in how to connect and adjust modules for obtaining a specific sound.
The complete A-100 operation manual is included if you order one of the basic systems or the mini system. If you purchase single modules or empty frames you have to order the operation manual additionally. Single modules do not contain the manual and manuals for single modules are not available in printed form (only the complete A-100 manual). But on our web site you will find all manuals in pdf format for print out.

The following pages show detailed information about the A-100 modules available at present (as of spring 2009). If you need additional information please visit our internet web site www.doepfer.com. Here you will find a more detailed description of each module, user’s manuals (pdf files) and sound examples. Also if you want to stay informed regarding new A-100 modules, we recommend to visit our web site now and then as you will find here current information about new A-100 modules and other products.
The A-100 manual is available in German or English language. Please tell us whether you need the German or English version when you order.
The A-100 basic systems and frames are available for 230V or 115V mains voltage. Please specify the version you need when you order.
## Module Overview

### A-100 CGK

**CV/Gate Keyboard**

- **Dimensions:** 790 length \( \sim \) 200 depth \( \sim \) 65 height (measures in mm)
- **Weight:** 4.2 kg

Monophonic keyboard with CV and Gate outputs, available as a ready built device with black aluminium case and a slightly weighted four octave keyboard (picture) or as an OEM module. The OEM version contains only the electronic kit and can be combined with any Fatar keyboard with 2, 3, 4 or 5 octaves.

The device has a Gate and three CV outputs available (CV1 = 1V/oct pitch 0...+5V, CV2 = velocity 0...+5V, CV3 = after touch 0...+4V). The A-100CGK is powered by an external 9V wall-outlet power supply or from the A-100 via the planned CGK adapter module. For this a sub-D connector with all signals is available at the rear panel of the keyboard. Six buttons with LEDs and a three-digit LED display is used to adjust the keyboard settings: assign mode (highest / lowest / last key), transpose (0...+12 semitones or 0/+1 octave, semitone or octave interval can be selected), retrigger on/off (i.e. legato on/off) and hold (gate is permanently "on"). In the configuration mode basic parameters are adjusted once, e.g. Gate polarity, number of octaves of the used keybed, MIDI channel.

The main application is the control of an A-100 system but even other modular systems or synthesizers can be controlled provided that they use the 1V/octave standard. The Gate can be jumpered for +5V, +10V or S-Trigger. In addition the A-100CGK has a MIDI out available to be able to control the planned A-100 keyboard controller.

### A-111-5

**Synthesizer Voice**

Complete monophonic synthesizer module that includes these components:

- **VCO**
  - Frequency range about 10Hz ... 12kHz
  - Manual tune and range switch -1 / 0 / +1 octave
  - FM (frequency modulation) control with modulation source switch (LFO1/off/ADSR)
  - Manual pulsedwidth control for rectangle waveform
  - PWM control with modulation source switch (LFO2/off/ADSR)
  - Waveform switch (sawtooth / off / triangle)
  - External CV inputs for VCO frequency (1V/octave) and PWM of the rectangle

- **VCA**
  - Manual amplitude control
  - AM (amplitude modulation) control with modulation source switch (LFO1/off/ADSR)
  - External CV input for VCA amplitude
  - Special control scale: exponential scale in the range from about -20dB to -80/90dB, linear scale from about -20dB to 0dB

- **LFO1 and LFO2**
  - Manual frequency controls and range switches (low, audio, medium)
  - Waveform switches (triangle / off / rectangle)
  - LED displays (dual green/red color for positive/negative share of the signal)

- **ADSR**
  - Manual controls for Attack, Decay, Sustain, Release and range switch (long, short, medium)
  - Blue LED display

**Remarks:**

- As the LFO frequencies can go up to moderate audio range (~ 5kHz) even audio FM effects of VCO (pitch and pulsedwidth), VCF and ADSR are possible!
- If the VCO is turned off (waveform switch = center position, pulsedwidth control = fully CCW) and the VCF resonance is set to maximum the module can be used as a sine oscillator. The sine can be modulated in a linear manner from the triangle wave of the VCO and by LFO2 in an exponential manner at the same time!
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<th>Module</th>
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<tr>
<td>A-101-1</td>
<td><img src="image1" alt="Module Sketch" /></td>
<td>VACTROL Steiner VCF&lt;br&gt;A special multitype filter based on an idea by Nyle A. Steiner from 1974 with three separate inputs (!) and one common output for the three filter types low, high and band pass, voltage controlled frequency and resonance (up to self oscillation) with vactrols, 2 LEDs for frequency/resonance control, normalled input sockets with separate attenuators for each input, consequently three different or the same audio signal can be used as filter input, with the same signal for all inputs different filter types including notch are possible</td>
<td>Frequency&lt;br&gt;Freq. LED&lt;br&gt;CVF2&lt;br&gt;CVF3&lt;br&gt;Resonance&lt;br&gt;Res. LED&lt;br&gt;CVQ2&lt;br&gt;LP Level&lt;br&gt;BP Level&lt;br&gt;HP Level&lt;br&gt;Res/Level</td>
<td>CVF1&lt;br&gt;CVF2&lt;br&gt;CVF3&lt;br&gt;CVQ1&lt;br&gt;CVQ2&lt;br&gt;LP In&lt;br&gt;BP In&lt;br&gt;HP In&lt;br&gt;Out 1&lt;br&gt;Out 2</td>
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<tr>
<td>A-101-2</td>
<td><img src="image2" alt="Module Sketch" /></td>
<td>VACTROL Lowpass Gate&lt;br&gt;the combination of a low pass and VCA; 3 modes: low pass / low pass + VCA / VCA; mode selectable with toggle switch or two gate inputs; controlling elements for frequency resp. amplification are so-called vactrols; control LED for frequency resp. amplification; manual and CV controlled frequency/amplification (two CV inputs, one with attenuator); manually adjustable resonance for low pass (no self oscillation); audio input with attenuator (distortion possible)</td>
<td>F/A&lt;br&gt;F/A LED&lt;br&gt;CV2&lt;br&gt;Level&lt;br&gt;Resonance&lt;br&gt;Function&lt;br&gt;LP/VCA/Both</td>
<td>CV In 1&lt;br&gt;CV In 2&lt;br&gt;Audio In&lt;br&gt;Audio Out&lt;br&gt;Function&lt;br&gt;Gate 1&lt;br&gt;Function&lt;br&gt;Gate 2</td>
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<tr>
<td>A-101-3</td>
<td><img src="image3" alt="Module Sketch" /></td>
<td>Modular Vactrol Phaser&lt;br&gt;modular 12-stage voltage controlled phase shifter; separate feedback inputs and audio outputs for each stage; as all inputs and outputs are free patchable completely new phaser and filter functions are possible (e.g. multiple feedback or forward loops for multiple resonance peaks or for insertion of other modules, e.g. VCA or VC polarizer); 12 vactrols as phase shifting elements; separate vactrol control for stages 1-6 and 7-12 with manually and voltage controlled phase shift; LED display for each group; two mixers (original/shifted signal); two polarizers for positive/negative feedbacks; normalled sockets (= two separate 6-stage phasers with adjustable positive/negative feedback)</td>
<td>Level 1 + 2&lt;br&gt;CV 1 + 2&lt;br&gt;Shift 1 + 2&lt;br&gt;Shift LED 1 + 2&lt;br&gt;Mix 1 + 2&lt;br&gt;Polarizer 1 + 2</td>
<td>Audio In&lt;br&gt;1-6 / 7-12&lt;br&gt;CV In 1-6 / 7-12&lt;br&gt;Shifted Audio In&lt;br&gt;1 / 2&lt;br&gt;Mixed Audio&lt;br&gt;Out 1 / 2&lt;br&gt;Polarizer In 1/2&lt;br&gt;Polarizer Out 1/2&lt;br&gt;Stage Out 1-12&lt;br&gt;Feedback In 1-12</td>
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<tr>
<td>A-101-9</td>
<td><img src="image4" alt="Module Sketch" /></td>
<td>Universal Vactrol Module&lt;br&gt;Two identical sub-units, each containing two voltage controlled resistors realized with so-called Vactrols, the resistors can be used to replace any variable resistor (potentiometer, fader) in any circuit thus introducing voltage control for the parameter in question, can be used for A-100 parameters (e.g. A/D/R of A-140 and A-143-2, A/D of A-143-1, frequency of A-104, Delay/Width of A-162, clipping of A-106) but even for external devices like effect units, wah-wah pedals, guitar stomp boxes, radio tuning and many more</td>
<td>for each sub-unit: CV (polarizer) Manual LED control</td>
<td>for each sub-unit: CV In Vactrol 1 (variable resistor output) Vactrol 2 (variable resistor output)</td>
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<tr>
<td>A-102</td>
<td><img src="image5" alt="Module Sketch" /></td>
<td>A-102: Diode Lowpass&lt;br&gt;description see A-120</td>
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<td>A-103</td>
<td><img src="image6" alt="Module Sketch" /></td>
<td>A-103: 18 dB Lowpass&lt;br&gt;description see A-120</td>
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<td>Module</td>
<td>Sketch</td>
<td>Description</td>
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<td>A-104</td>
<td><img src="image" alt="A-104 Diagram" /></td>
<td><strong>Trauontum Formant Filter</strong>&lt;br&gt;four independent manually controlled band pass/low pass filters as used in the <strong>Mixtur Trauontum</strong> (see also A-113), controls for each filter: frequency (about 40Hz – 8kHz), resonance, mode (switch) and output level, each filter can be switched to low pass, band pass or off, common audio input and output, common input level control (also used as distortion control as the audio input is very sensitive)&lt;br&gt;A similar filter module with voltage control of the filter frequencies is the A-127.</td>
<td>• Input Level for each filter:&lt;br&gt;• Frequency&lt;br&gt;• Resonance&lt;br&gt;• Mode (switch)&lt;br&gt;• Level</td>
<td>• Audio In&lt;br&gt;• Audio Out</td>
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<tr>
<td>A-105</td>
<td><img src="image" alt="A-105 Diagram" /></td>
<td><strong>24 dB SSM Low Pass</strong>&lt;br&gt;24dB low pass built with special circuit SSM2044; same controls as the CEM-based A-122 but different sound and resonance behaviour; the special feature of the 4 pole low pass SSM2044 is the patented so-called “true open loop design that delivers a characteristic fat sound not available from other devices” (extract from SSM2044 data sheet) This chip was used in synthesizers made by Korg, Sequential, Emu, Fairlight and PPG; voltage controlled resonance; sensitive audio input (distortion possible)</td>
<td>• Audio Level&lt;br&gt;• Frequency&lt;br&gt;• FCV2&lt;br&gt;• Resonance&lt;br&gt;• QCV</td>
<td>• Audio In&lt;br&gt;• FCV1&lt;br&gt;• FCV2&lt;br&gt;• QCV&lt;br&gt;• Audio Out</td>
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<tr>
<td>A-106-1</td>
<td><img src="image" alt="A-106-1 Diagram" /></td>
<td><strong>X-treme Filter</strong>&lt;br&gt;a very special filter that has it’s origin the MS20 filters. Can be used as a 12dB low pass and 6dB high pass simultaneously with two different audio inputs and a common output. Sensitive audio inputs for distortion effects. The positive/negative limiting can be adjusted manually (CL+CL-, incl. option for ext. vacrot connection). Two different CV inputs: one with attenuator, one with polarizer. The low pass audio input is normalised to the high pass input which is equipped with a polarizer to obtain filters similar to band pass and notch by adding or subtracting the low and high pass input shares. Resonance control up to self-oscillation, resonance insert feature to insert other modules into the resonance path. All in all the A-106 it is a very unique and strange filter and has a lot of life of its own. Much more detailed information incl. sound examples is available on our web site.</td>
<td>• Frequency&lt;br&gt;• CV2&lt;br&gt;• CV3&lt;br&gt;• Audio Level LP&lt;br&gt;• Audio Level HP&lt;br&gt;• Clipping+&lt;br&gt;• Clipping-&lt;br&gt;• Resonance</td>
<td>• CV1&lt;br&gt;• CV2&lt;br&gt;• CV3&lt;br&gt;• Audio In LP&lt;br&gt;• Audio In HP&lt;br&gt;• Resonance send&lt;br&gt;• Resonance receive&lt;br&gt;• Audio Out</td>
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<tr>
<td>A-106-5</td>
<td><img src="image" alt="A-106-5 Diagram" /></td>
<td><strong>SEM VCF</strong>&lt;br&gt;12dB multimode filter based on the filter circuit of the Oberheim SEM module, band pass and combined low/notch/high pass output, a control knob defines the relation between low and high pass signal for the combined output (center position = notch), no self oscillation (in contrast to most of the other filters of the A-100 system), audio signal distorts if the level control is set to about center position or more. The function and operation of this module is very similar to the Wasp filter module A-124. But the sound of both filters is very different!</td>
<td>• Audio Level&lt;br&gt;• Frequency&lt;br&gt;• CV2&lt;br&gt;• Resonance&lt;br&gt;• Mix (relation between low and high pass)</td>
<td>• Audio In&lt;br&gt;• CV 1&lt;br&gt;• CV 2&lt;br&gt;• Band Pass Out&lt;br&gt;• Mix Out</td>
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<tr>
<td>A-106-6</td>
<td><img src="image" alt="A-106-6 Diagram" /></td>
<td><strong>XP VCF / Filter Pool</strong>&lt;br&gt;multitype filter based on the very special filter circuit of the Oberheim Xpander, 16 different filter types available, e.g. 6/12/18/24dB low pass, 6/12/18dB high pass, several band pass filters with different slopes (symmetrical or asymmetrical), notch filters, all pass filters and some combinations of these filters (e.g. notch + low pass or all pass + low pass), 8 filters available at the same time (i.e. 8 outputs ) arranged in two groups, group is selected by a toggle switch, manual frequency control and two CV inputs (one with attenuator), voltage controlled resonance with manual control and CV input with attenuator</td>
<td>• Audio Level&lt;br&gt;• Frequency&lt;br&gt;• CV F2&lt;br&gt;• Resonance (Q)&lt;br&gt;• CV Q&lt;br&gt;• Filter Group (toggle switch)</td>
<td>• Audio In&lt;br&gt;• CVF 1&lt;br&gt;• CVF 2&lt;br&gt;• CVQ&lt;br&gt;• Filter Outputs:&lt;br&gt; 3A/3A1L&lt;br&gt; 2N/2N1L&lt;br&gt; 2H1/4B&lt;br&gt; 3H/3H1L&lt;br&gt; 2H/2H1L&lt;br&gt; 1H/2B&lt;br&gt; 3L/4L&lt;br&gt; 1L/2L</td>
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Module Overview

**A-107**

Width: 26 HP  
Current: 200 mA  
(as all 12X numbers are used up the 10X numbers are used for new filters)

**A-107: VC Multitype Morphing filter**

- Completely new filter design that makes available 36 different filter types, e.g. 6/12/18/24dB low pass, 6/12/18dB high pass, several band pass, notch and all pass filters, as well as some new filters that have no names so far. The frequency response curves of some filters are shown in the sketch below. The filters can be arranged in filter chains with 32 steps each. It is possible to pass through the filter sequence of each chain manually or with an external control voltage. Alternatively a Clock signal can be used to trigger the advance to the next step of the chain. 64 free programmable filter chains are available.

Morphing is possible only within one group. Between filters of group 1/2 only “hard” switching is possible. Of course all standard filter functions are available: frequency and resonance control manually and by an external control voltage (2 CV inputs available, one with attenuator). For the 18 filters of group 1 self oscillation is possible. The filters of group 2 do not support self oscillation. On top of this a final VCA with manual and CV control is available. This VCA can be used e.g. to compensate different audio levels (e.g. morphing from low pass to high pass will cause a level change for high or low frequency settings).

Selecting a single filter, programming and selecting the filter chains is carried out with a 3-digit display, 4 buttons and a rotary encoder. More detailed information about the module (with frequency response curves, sound examples, patch examples, complete user’s manual) is available on our web site www.doepfer.com

**A-108**

Width: 12 HP  
Current: 40 mA  
(as all 12X numbers are used up the 10X numbers are used for new filters)

**6/12/24/48 dB Low / Band Pass**

- Complete new filter design based on Moog’s transistor ladder but with 8 filter stages, internal 6...48dB slope low pass and band pass available, the low pass outputs with 6, 12, 24 and 48 dB slope are connected to four jack sockets (factory setting), by changing the internal jumper settings other stages (e.g. 18dB or 36dB) can be selected as outputs, resonance control including self-oscillation, external feedback input for insertion of other A-100 modules (e.g. VCA or phaser), in combination with A-135 and A-144 a filter with VC slope 6...48dB can be realized

- Frequency  
- CV2, CV3 (Attenuators)  
- Audio Level  
- Emphasis (Resonance)  
- 6dB Low Pass  
- 12dB Low Pass  
- 24dB Low Pass  
- 48dB Low Pass  
- Band Pass  
- CV1  
- CV2  
- CV3  
- Audio In  
- Feedback In

**A-109**

Width: 20 HP  
Current: 30 mA  
(as all 12X numbers are used up the 10X numbers are used for new filters)

**Voltage Contr. Signal Processor**

- Combined module that contains a 24 dB Low Pass with voltage controlled resonance, a VCA and a VC panning unit, the VCF is a standard 4 pole low pass filter with voltage controlled resonance; resonance ranges from 0dB up to self oscillation; the main VCA has a combined exponential/linear control scale; manual control and 2 CV inputs (one with attenuator) for each of the 4 parameters: frequency, resonance, amplification and panning; normalised sockets for standard VCF - VCA - PAN configuration; built with Doug Curtis’ CEM3379; low cost replacement for three separate VCF/VCA/Panning modules

- VCF:  
  - Audio Level  
  - Frequency  
  - Resonance  
  - CVF  
  - CVQ  
- VCA:  
  - Amplitude  
  - CVA  
  - Panning:  
  - Pan  
  - CVP  
- VCF:  
  - VCF In 1 + 2  
  - CVF1, CVF2  
  - CVQ1, CVQ2  
  - VCF Out  
- VCA:  
  - VCA In  
  - CVA1, CVA2  
  - VCA Out  
- PAN:  
  - PAN In  
  - CVP1, CVP2  
  - Pan Out 1 + 2  

More detailed information about the module including sound examples is available on our web site www.doepfer.com
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Module Overview

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<tr>
<td>A-188-1</td>
<td></td>
<td>BBD Module</td>
<td>• Delay Clock</td>
<td>CV1 In, CV2 In, CV Out, Clock In, Feedback In (normalled to Clock Out), Feedback In (normalled to BBD Out), Mix Out</td>
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<tr>
<td>X: 128 stages (*)</td>
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<td>• CV1 Polarity</td>
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<td>Y: 256 stages (*)</td>
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<td></td>
<td>• CV2 Polarity</td>
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<td>A: 512 stages (*)</td>
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<td>• CV2 Level</td>
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<td>B: 1024 stages (S)</td>
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<td>• Audio Level</td>
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<td>C: 2048 stages (S)</td>
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<td>• Feedback Polarity</td>
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<td>D: 4096 stages</td>
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<td>• Feedback Level</td>
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<td>• Mix Polarity</td>
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<td>• Mix</td>
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<td>(Original/BBD)</td>
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<td>complex BBD (bucket brigade device) module with a lot of parameters and</td>
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<td>extreme clock/delay range, can be used for standard applications like</td>
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<td>flanging, chorus, analog delay but even to generate Very extreme and</td>
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<td>strange sounds especially at low clock settings, available with</td>
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<td>different BBD circuits (128/256/512/1024/2048/4096 stages, also</td>
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<td>suitable for Karplus-Strong synthesis, contains essentially a high</td>
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<td>speed VCO for the BBD clock and the BBD circuit with several mixing,</td>
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<td>normalising and polarity switching features</td>
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<td>We recommend to visit our website <a href="http://www.doepfer.com">www.doepfer.com</a> for more details and</td>
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<td>sound examples.</td>
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<tr>
<td>A-188-2</td>
<td></td>
<td>Tapped BBD Module</td>
<td>• 3328 mix 1</td>
<td>3328 out, 2790 out, 1726 out, 1194 out, 662 out, 396 out, CV In 1, CV In 2, CV Out, Clock Out, Clock In (normalled to Clock Out), Feedback In (normalled to 396 Out), Mix Out 1 (2x), Mix Out 2 (2x)</td>
</tr>
<tr>
<td>Width: 30 HP</td>
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<td>extremely versatile module with a tapped BBD (bucket brigade device) as</td>
<td>• 2790 mix 1</td>
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<td>Current: 120 mA</td>
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<td>its core. Each of the six taps has two level controls available to add</td>
<td>• 1726 mix 1</td>
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<td>the corresponding tap output positive or negative to one of the two mix</td>
<td>• 1194 mix 1</td>
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<td>busses. Each mix has a separate wet/dry control. The clock/delay range is</td>
<td>• 662 mix 1</td>
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<td></td>
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<td>similar to the A-188-1 (i.e. extreme wide range, manually and voltage</td>
<td>• 396 mix 1</td>
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<td>controlled). One of the mix outputs or a single tap can be used for the</td>
<td>• 3328 mix 2</td>
<td></td>
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<td></td>
<td></td>
<td>feedback loop (default = tap #1). Because of the 6 taps and the two mix</td>
<td>• 2790 mix 2</td>
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<td></td>
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<td>busses very complex and dense BBD effects can be realized - even in</td>
<td>• 1726 mix 2</td>
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<td></td>
<td></td>
<td>stereo. Even the standard BBD effects are possible (flanging, chorus,</td>
<td>• 1194 mix 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>analog delay, reverb) but with extreme possibilities.</td>
<td>• 662 mix 2</td>
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<td></td>
<td></td>
<td>• 396 mix 2</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Wet/Dry 1</td>
<td></td>
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<td></td>
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<td></td>
<td>• Wet/Dry 2</td>
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<td></td>
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<td></td>
<td>• Delay (Clock)</td>
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<td></td>
<td></td>
<td></td>
<td>• CV2 Level</td>
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<td></td>
<td>• Input Level</td>
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<td></td>
<td>• Feedback</td>
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<tr>
<td>Visit our website <a href="http://www.doepfer.com">www.doepfer.com</a> for more details and sound examples.</td>
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**Module Overview**

### Analog Modular System A-100

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<tr>
<td><strong>A-110</strong></td>
<td><img src="image.png" alt="A-110 Sketch" /></td>
<td><strong>Standard VCO</strong>&lt;br&gt;voltage controlled oscillator (standard version); 4 waveforms: rectangle with adjustable pulse width 0...100% (including pulse width modulation), sawtooth, triangle, sine; hard sync input; 2 CV inputs: CV1 (1V/Oct.), CV2 with attenuator, 5-position range switch (5 octaves), Tune control, frequency range about 1 Hz ... 10 kHz; 2 CV inputs for pulselwidth (one with attenuator)&lt;br&gt;<em>Difference to High-End VCO:</em> frequency range, waveforms not 100% ideal (musically not a disadvantage in every case), no linear FM input, no soft sync input</td>
<td>• Range (5-step rotary switch)&lt;br&gt;• Tune&lt;br&gt;• CW Width&lt;br&gt;• PW CV2</td>
<td><img src="image.png" alt="A-110 Controls" /> [CV 1][CV 2][PW CV1][PW CV2][SYNC][Rectangle][Saw][Triangle]</td>
</tr>
<tr>
<td><strong>A-111-1</strong></td>
<td><img src="image.png" alt="A-111-1 Sketch" /></td>
<td><strong>High-End VCO</strong>&lt;br&gt;same features as A110, but with these improvements:&lt;br&gt;frequency range &gt; 1 : 40,000 (typ. 1 Hz ... 40 kHz); improved waveforms; linear FM input; soft sync input, 2 pitch controls (Tune and Fine), 8-position range switch (8 octaves)&lt;br&gt;<em>The module will be manufactured as long as the special integrated VCO circuit (CEM3340) is available.</em></td>
<td>• Range (7-step rotary switch)&lt;br&gt;• Tune&lt;br&gt;• Fine&lt;br&gt;• CW Width&lt;br&gt;• Pulse Width CV&lt;br&gt;• PW CV2</td>
<td><img src="image.png" alt="A-111-1 Controls" /> [CV 1][CV 2][PCV][Hard Sync][Soft Sync][Linear FM][Rectangle][Saw][Triangle][Sine]</td>
</tr>
<tr>
<td><strong>A-111-5</strong></td>
<td><img src="image.png" alt="A-111-5 Sketch" /></td>
<td><strong>Synthesizer Voice</strong> (see page 3)&lt;br&gt;8 Bit Sampler/Wavetable Oscillator&lt;br&gt;sampling module with 8 bit resolution, 2x 64KB sampling/wavetable memory (2 pages), 5 octaves pitch range, MIDI dump, dump program for PC, sound library and wavetable generator available via internet for free&lt;br&gt;• Sampler with pitch CV, record/play/dump&lt;br&gt;• Wavetable oscillator with pitch CV and second CV for passing through the 256 wavetables (each table has 256 byte)&lt;br&gt;• Effects (normal/reverse delay, harmonizer, pitch shift)</td>
<td>• Tune&lt;br&gt;• Attenuator&lt;br&gt;• Audio/4V2&lt;br&gt;• manual Trig.&lt;br&gt;• Gate (LED)&lt;br&gt;• 3 switches for mode control</td>
<td><img src="image.png" alt="A-111-5 Controls" /> [CV1 (tune)][Audio In / CV2 (Wavetable)][Audio Out][MIDI In][MIDI Out]</td>
</tr>
<tr>
<td><strong>A-113</strong></td>
<td><img src="image.png" alt="A-113 Sketch" /></td>
<td><strong>Subharmonic Generator</strong>&lt;br&gt;4 separate so-called subharmonics (this term was first used in the Trautonium by Oskar Sala), relation of the frequency of each subharmonic is adjusted with up/down buttons in the range 1...24 and is displayed with 2-digit LED displays, rectangle master frequency input (e.g. from A-110/111), sawtooth output, single and mix output, two gate inputs to switch between 4 different &quot;mixtures&quot;, 50 user defined presets with 4 different mixtures, detailed information regarding A-113/ Trautonium is available on our web site <a href="http://www.doepfer.com">www.doepfer.com</a></td>
<td>• 4 x 2-digit LED display&lt;br&gt;• 4 x Up/Down (8 buttons)&lt;br&gt;• Preset (button)&lt;br&gt;• Store (button)&lt;br&gt;• 4 x Level</td>
<td><img src="image.png" alt="A-113 Controls" /> [Master Freq. In (Rectangle)][4 x Single Out][Mix Out][Gate 1 In][Gate 2 In]</td>
</tr>
<tr>
<td><strong>A-114</strong></td>
<td><img src="image.png" alt="A-114 Sketch" /></td>
<td><strong>Dual Ring Modulator</strong>&lt;br&gt;2 separate ring modulators; a ring modulator generates the product X*Y of two audio input signals X and Y (four quadrant multiplier); consequently the output signal contains the sum and the difference of the input frequencies; used for generating the typical ring modulator and frequency transforming sounds, normally used in combination with 2 VCOs but also in combination of a VCO with an external signal (e.g. via A-119)</td>
<td>• per ring modulator:&lt;br&gt;• X In&lt;br&gt;• Y In&lt;br&gt;• X • Y Out</td>
<td><img src="image.png" alt="A-114 Controls" /> [per ring modulator][X In][Y In][X • Y Out]</td>
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**Technical data are subject to change**

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| A-115    |        | **AUDIO DIVIDER**<br>frequency divider for audio signals; preferable the rectangle output of a VCO is used as input but in combination with A-119 even clean monophonic external audio sources can be used; mixer for original (= input signal) and the next four octaves below (outputs = symmetrical rectangles); typical application: generating sub-octaves for powerful bass sounds, alienation effects for external audio sources, for strange inharmonic effects even non-monophonic signals can be divided (e.g. polyphonic or noise, preferable from the digital noise generator A-117) | • Orig.  
• F / 2  
• F / 4  
• F / 8  
• F / 16 | • In  
• Out |
| A-116    |        | **WP - VC Waveform Processor**<br>dynamic waveform processing by clipping and asymmetrical amplification of clipped and unclipped signal; manual control and modulation inputs for clipping level and symmetry; application: generating new waveforms with dynamic variation of the waveforms via clipping and/or symmetry control inputs<br>The A-116 is similar to the A-136 but has only two voltage controlled modification parameters (clipping and symmetry). However these are voltage controlled in contrast to the A-136. | • Level  
• Clipping Level  
• Clipping CV  
• Symmetry CV  
• Symmetry | Audio In  
Clipping CV  
Symmetry CV  
Audio Out |
| A-117    |        | **DNG / 808 - Digital Noise / Random Clock / 808-Source**<br>digital clock generator with adjustable frequency (spectrum); high frequency = noise, low frequency = random pulses (like “Geiger-Counter”); typical application: 2nd noise generator with different sound, effect sounds, random clock pulses 808 Source with ROLAND TR 808 sound generator (6 fixed square pulse oscillators) for the typical sounds Cow Bell, Cymbal and Hi-Hats; output with 2 oscillators (Mix 2) and 6 oscillators (Mix 6) | • Rate / Spectrum | Noise / Clock Out  
Ext. Clock In  
Mix 2  
Mix 6 |
| A-118    |        | **Noise / Random**<br>standard analog noise generator (noise derived from transistor) with white and colored noise outputs<br>red and blue level of colored noise adjustable random voltage output rate (i.e. variation speed) and level adjustable | • Red Level  
• Blue Level  
• Random Rate | White Noise  
Color Noise  
Random |
| A-119    |        | **External Input / Envelope Follower**<br>input module for including external audio signals into A-100 sound processing symmetrical input (stereo jack ¼”) with input level control<br>envelope follower with gate generator (e.g. for triggering ADSR generator from external audio) adjustable gate threshold application: including external audio signals into A-100, especially for sound modification with filters, VCA’s, phasers, etc. | • Audio Level  
• Threshold | Audio In (¼ “)  
Stereo jack)  
Audio Out  
Envelope  
Gate |
**Module Overview**

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<tr>
<td>A-102</td>
<td><img src="image1.png" alt="A-102 Sketch" /></td>
<td><strong>DOEPFER</strong></td>
<td>all modules:</td>
<td>for all modules:</td>
</tr>
<tr>
<td>A-103</td>
<td><img src="image2.png" alt="A-103 Sketch" /></td>
<td><strong>DOEPFER</strong></td>
<td></td>
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</tr>
<tr>
<td>A-120</td>
<td><img src="image3.png" alt="A-120 Sketch" /></td>
<td><strong>DOEPFER</strong></td>
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</table>

- **A-102**: Diode Low Pass 1 (VCF 9)
- **A-103**: 18 dB Low Pass 1
- **A-120**: 24 dB Low Pass 1
- **A-121**: 12 dB Multimode Filter
- **A-122**: 24 dB Low Pass 2
- **A-123**: 24 dB High Pass
- **A-124**: Wasp Filter (VCF 5)

**Technical data are subject to change**

---

**Module A-102**

- **Current**: 40 mA
- **Width**: 6 HP
- **Type**: Low Pass Filter
- **Description**: All 3 filters are based on the so-called ladder principle (invented by Bob Moog) but with different types of electronic parts that are responsible for the special sound of each filter.

**Module A-103**

- **Current**: 30 mA
- **Width**: 8 HP
- **Type**: Low Pass Filter
- **Description**: The module will be manufactured as long as the special integrated circuit (CEM3320) is available.

**Module A-120**

- **Current**: 30 mA
- **Width**: 8 HP
- **Type**: Low Pass Filter
- **Description**: The module production has been stopped as the special integrated circuit (CEM3320) is no longer available.

**Module A-121**

- **Current**: 12 HP
- **Width**: 30 mA
- **Type**: Multimode Filter
- **Description**: Voltage controlled 12 dB multimode filter with 4 simultaneous outputs: low pass, high pass, band pass and notch; resonance (emphasis) adjustable up to self-oscillation; manual control, one modulation input with attenuator, one modulation input without attenuator for both filter frequency and filter resonance (i.e., voltage controlled resonance); built with Doug Curtis' CEM3320, in combination with A-135 and A-144 “morphing” between the four filter outputs is possible. The module will be manufactured as long as the special integrated circuit (CEM3320) is available.

**Module A-122**

- **Current**: 20 mA
- **Width**: 8 HP
- **Type**: Low Pass Filter
- **Description**: Another low pass filter with 24 dB/oct slope but with a distinctly different sound and resonance behaviour compared to A105 or A-120; the A-122 is built with a CEM circuit and works with the so-called OTA principle (like most of the Oberheim filters); resonance is adjustable up to self-oscillation; manual frequency control and two frequency modulation inputs (one with attenuator); manual control and one modulation input with attenuator for resonance (i.e., voltage controlled resonance); audio input with attenuator.

**Module A-123**

- **Current**: 20 mA
- **Width**: 8 HP
- **Type**: High Pass Filter
- **Description**: High pass filter with 24 dB/oct slope, distinctly different sound and resonance behaviour compared to the high pass filters of A-107, A-121 or A-124; the A-123 is built with a CEM circuit (CEM3320); resonance is adjustable up to self-oscillation; manual frequency control and two frequency modulation inputs (one with attenuator); manual control and one modulation input with attenuator for resonance (i.e., voltage controlled resonance); audio input with attenuator. The module production has been stopped as the special integrated circuit (CEM3320) is no longer available.

**Module A-124**

- **Current**: 40 mA
- **Width**: 8 HP
- **Type**: Wasp Filter (VCF 5)
- **Description**: 12dB multimode using the “strange” filter circuit of the “EDP Wasp” (analog synthesizer with black/yellow case built end of the seventies); this design “abuses” digital inverters as analog operational amplifiers leading to distortions and other “dirty” effects that generate the specific sound of this filter; band pass output, low/notch/high pass output with adjustable relation of low and high pass signal (if both signals appear one obtains a notch filter); resonance control (but no self oscillation).
<table>
<thead>
<tr>
<th>Module</th>
<th>Sketch</th>
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<th>Controls</th>
<th>In/Outputs</th>
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<tbody>
<tr>
<td>A-125</td>
<td><img src="image" alt="Sketch A-125" /></td>
<td><strong>Voltage Controlled Phaser VCP</strong>&lt;br&gt;voltage-controlled phaser with resonance; manual control and modulation input for phase shift; manual controls for resonance and ratio between original and phase shift signal in combination with the Shepard Generator A-191, VC Mixer A-135 and four A-125 so-called babepole phasing effects can be realized (up or down going never ending phasing)&lt;br&gt;For a Vactrol based Phaser see A-101-3</td>
<td>- Audio Level&lt;br&gt;- Phase&lt;br&gt;- CV2&lt;br&gt;- Resonance&lt;br&gt;- Signal Ratio</td>
<td>- Audio In&lt;br&gt;- CV 1&lt;br&gt;- CV 2&lt;br&gt;- Audio Out</td>
</tr>
<tr>
<td>A-126</td>
<td>NO LONGER AVAILABLE</td>
<td><strong>VCFS Voltage Controlled Frequency Shifter</strong>&lt;br&gt;analog frequency shifter, shift range about 50Hz...5kHz, manual shift control (knob) and via external control voltage (with attenuator), audio outputs for shift up, shift down and mix, mix control; up/down relation for mix output, overload led, audio output without effect (same level as shift outputs)&lt;br&gt;applications: robot voices, changing the pitch of voices (male -&gt; female, female -&gt; male), frequency shifting sound effects (similar to ring modulator)</td>
<td>per band pass: - Level&lt;br&gt;- Shift&lt;br&gt;- CV&lt;br&gt;- Mix&lt;br&gt;- Overload LED</td>
<td>- Audio In&lt;br&gt;- Audio Out (no effect)&lt;br&gt;- CV&lt;br&gt;- Down Out&lt;br&gt;- Up Out&lt;br&gt;- Mix Out</td>
</tr>
<tr>
<td>A-127</td>
<td><img src="image" alt="Sketch A-127" /></td>
<td><strong>Voltage Controlled Resonance Filter</strong>&lt;br&gt;3 x bandpass with VC frequency (40...10kHz) for each filter with controls for frequency (0.05...20Hz) and level, ext. CV input (instead of LFO), single audio outputs, common audio input with level control, original level control, mixed audio output (original + 3 x band pass), sensitive audio inputs for distortion effects, applications: complex free running filter sweeps, resonance simulation, vocoder-like effects, MIDI controlled triple filter (with A-191)</td>
<td>per band pass: - LFO Freq.&lt;br&gt;- LFO/VC Ampl.&lt;br&gt;- VCF Freq.&lt;br&gt;- Resonance&lt;br&gt;- Level&lt;br&gt;common: - Audio In&lt;br&gt;(Single)&lt;br&gt;(Mix)</td>
<td>per band pass: - ext. CV In&lt;br&gt;- Audio Out&lt;br&gt;- Audio In&lt;br&gt;- Audio Out&lt;br&gt;- Audio Out&lt;br&gt;- Mix Out</td>
</tr>
<tr>
<td>A-128</td>
<td><img src="image" alt="Sketch A-128" /></td>
<td><strong>Fixed Filter Bank</strong>&lt;br&gt;15 band pass filters with fixed frequencies (50 Hz, 75 Hz, 110 Hz, 150 Hz, 220 Hz, 350 Hz, 500 Hz, 750 Hz, 1.1 kHz, 1.6 kHz, 2.2 kHz, 3.6 kHz, 5.2kHz, 7.5 kHz, 11.0 kHz); amplitude controllable for each band pass</td>
<td>per band pass: - Amplitude (15x)</td>
<td>- Audio In&lt;br&gt;- Audio Out</td>
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#### A-129-1
**Width:** 32HP (20 HP + 12HP)  
**Current:** 180 mA (1+2)

#### A-129-2
**Width:** 16 HP  
**Current:** 40 mA

#### A-129-3
**Width:** 8 HP  
**Current:** 30 mA

#### A-129-4
**Width:** 8 HP  
**Current:** 30 mA

#### A-129-5
**Width:** 8 HP  
**Current:** 30 mA

---

#### Modular Vocoder Subsystem

The A-129 modules form a modular vocoder subsystem. The basic modules of the vocoder are the Analysis section (A-129/1) and the Synthesis section (A-129/2). The A-129/1 analyses the spectral contents of an incoming speech signal with 15 filters (1 low pass, 13 band passes, 1 high pass) and outputs 15 corresponding control voltages. In the basic patch these are used to control the 15 CV inputs of the Synthesis section A-129/2. As audio input of the A-129/2 normally an instrumental sound (e.g. VCO, noise or complex instrument signal, but no speech) is used. In this way, each frequency band in the instrument signal has the dynamics of the corresponding band from the speech signal. The pattern of the speech signal is thus re-constructed from the tonal raw material of the instrument signal - the instruments seems to “speak”. The audio output of the A-129/2 is the Vocoder output. This is the basic patch of the vocoder. The modules A-129/1 and 2 are available only together as the A-129 basic vocoder modules.

The basic patch can be extended by the optional modules A-129/3, 4 and 5.

---

#### A-129/2:
- Speech
- CV In 5
- CV In 4
- CV In 3
- CV In 2
- CV Out 5
- CV Out 4
- CV Out 3
- CV Out 2
- CV Out 1

---

#### A-129/3:
- Attenuator / Offset Generator / Slew Limiter (optional)
- Frequency response of the 15 filters
- 15 x input
- 15 x output
- 5 x Attenuator
- 5 x Offset
- 5 x CV In
- 5 x CV Out
- Slew Control Input (from A-129/4)
- Slew CV In
- Freeze In
- 3 x Slew Control Out (to A-129/3)

---

#### A-129/4 Slew Limiter Controller SLC (optional)
- Manual Slew Rate
- Freeze/Slew/Follow (switch)
- Slew CV
- Control LED

---

#### A-129/5 Voiced/Unvoiced Detector (optional)
- Gain
- Treble Boost
- Unvoiced LED
- Speech In
- Speech Out
- Gate Out
- Voiced In
- Unvoiced In
- Voiced/Unvoiced Out

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<tr>
<td>A-130/A-131</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>VCA - Voltage Controlled Amplifier</strong>&lt;br&gt; voltage controlled amplifiers to control the loudness or volume of an audio (or even control) signal with a control voltage (e.g. from an envelope generator or LFO)&lt;br&gt; A-130: linear characteristic&lt;br&gt; A-131: logarithmic characteristic&lt;br&gt; 2 audio inputs with attenuators; 2 control voltage inputs (one with attenuator); manual control for initial gain; output attenuator (to adjust the output level if the module is the last module connected to an mixer/amplifier)</td>
<td>- Audio In 1&lt;br&gt; - Audio In 2&lt;br&gt; - Gain&lt;br&gt; - CV 2</td>
<td>- Audio In 1&lt;br&gt; - Audio In 2&lt;br&gt; - CV 1&lt;br&gt; - CV 2&lt;br&gt; - Audio Out</td>
</tr>
<tr>
<td>A-132-1</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Dual Low Cost VCA</strong>&lt;br&gt; 2 simple linear low cost VCA, e.g. for level control of modulation signals (e.g. ADSR or LFO); suitable as well for non-critical audio applications (e.g. high level signals from VCOs, noise or sample module); when offset and attenuation of the control signal is required one channel of the A-129/3 can be used for this purpose.</td>
<td>- Amp.&lt;br&gt; - CV2 (Polarizer)</td>
<td>- CV1 In&lt;br&gt; - CV2 In&lt;br&gt; - Signal In 1&lt;br&gt; - Signal In 2&lt;br&gt; - Signal In 3&lt;br&gt; - Signal In 4&lt;br&gt; - Signal Out 1&lt;br&gt; - Signal Out 2&lt;br&gt; - Signal Out 3&lt;br&gt; - Signal Out 4</td>
</tr>
<tr>
<td>A-132-2</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Quad VCA</strong>&lt;br&gt; fourfold VCA with common level control section for all VCA, manual level control Amp. and two control voltage inputs CV1 and CV2 are available, CV2 is equipped with a polarizer to adjust the effect and polarity of the external control voltage, applications: simultaneous amplitude/level control of four different audio or CV signals (e.g. A-143-x quad modulation sources), internal connector that can be used to normalize the four input sockets to other modules (e.g. the quadrature LFO/VCO A-129/3 can be equipped with a suitable internal matching connector)</td>
<td>- CV1 In&lt;br&gt; - CV2 In&lt;br&gt; - Signal In 1&lt;br&gt; - Signal In 2&lt;br&gt; - Signal In 3&lt;br&gt; - Signal In 4&lt;br&gt; - Signal Out 1&lt;br&gt; - Signal Out 2&lt;br&gt; - Signal Out 3&lt;br&gt; - Signal Out 4</td>
<td></td>
</tr>
<tr>
<td>A-132-3</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Dual linear/exponential VCA</strong>&lt;br&gt; two identical voltage controlled amplifiers, each VCA has a manual gain control and a control voltage input with attenuator, the character of the control scale can be switched to linear or exponential, all inputs and outputs are DC coupled, consequently the VCAs can be used to process both audio and control voltages, the input has no attenuator available but is capable to process up to 16Vss signals (i.e. -8V...+8V) without distortion.&lt;br&gt; <em>The module will be manufactured as long as the special integrated circuit (CEM3360) is available.</em></td>
<td>each VCA: - CV&lt;br&gt; - Gain&lt;br&gt; - lin./exp. (toggle switch)</td>
<td>each VCA: - CV In&lt;br&gt; - Signal In&lt;br&gt; - Signal Out&lt;br&gt; - Signal Out</td>
</tr>
<tr>
<td>A-133</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Dual Voltage Controlled Polarizer</strong>&lt;br&gt; special dual voltage controlled amplifier that enables both positive and negative amplifications; negative amplification means in this context that the signal is inverted; main application: processing of control voltages, e.g. ADSR or LFO; amp. range: ~ -2.5...0...+2.5; amp. can be adjusted manually (Man control) and by an external control voltage with attenuator (CV); the present amplification is displayed with two LEDs: one for positive and one for negative amplifications (not a signal display but amplification display, similar to A-134); another module with polarizing function is 138c.</td>
<td>each Polarizer: - CV&lt;br&gt; - Man&lt;br&gt; - + LED&lt;br&gt; - - LED</td>
<td>each Polarizer: - CV In&lt;br&gt; - Signal In&lt;br&gt; - Signal Out&lt;br&gt; - Signal Out</td>
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<td>A-134-1</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>PAN - Voltage Controlled Panning</strong>&lt;br&gt; manual or voltage controlled panning via two CV control inputs (one with attenuator). 2 LEDs for panning display, two panning types available:&lt;br&gt;• input panning: panning between 2 input signals, the output appears at the mix output&lt;br&gt;• output panning: distributing one input signal to two outputs (left and right output)</td>
<td>• Tune&lt;br&gt;• Attenuator&lt;br&gt;• Audio/VC2&lt;br&gt;• manual Trig.&lt;br&gt;• Gate (LED)&lt;br&gt;• 3 switches for mode control</td>
<td>• CV1 (tune)&lt;br&gt;• Audio In / CV2 (Wavetable)&lt;br&gt;• Audio Out&lt;br&gt;• Gate In&lt;br&gt;• MIDI In&lt;br&gt;• MIDI Out</td>
</tr>
<tr>
<td>A-134-2</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Dual Voltage Controlled Crossfader</strong>&lt;br&gt;two identical voltage controlled crossfader units, in/outputs are DC coupled, i.e. the module can be used for both audio and control voltage signal processing, each unit has two VCAs with opposite control behaviour available&lt;br&gt;Two types of control voltage behaviour (internal jumper): Symmetrical: both VCAs have 50% amplification @ 0V CV. If CV becomes positive the amplification of VCA1 increases and VCA2 decreases. Useful for bipolar CVs (e.g. LFO, joy stick)&lt;br&gt;Asymmetrical: VCA1 is fully closed and VCA2 has full 100% amplification with zero CV. If the applied CV becomes positive the amplification of VCA1 increases and those of VCA2 decreases. Useful for positive CVs (e.g. ADSR, Ribbon)</td>
<td></td>
<td>each sub-unit:&lt;br&gt;• CV In&lt;br&gt;• Signal In A&lt;br&gt;• Signal In B&lt;br&gt;• Out</td>
</tr>
<tr>
<td>A-135</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Voltage Controlled Mixer</strong>&lt;br&gt;quad voltage controlled mixer made of 4 independent linear VCA’s with one common output. For each VCA the following inputs and controls are available: audio and control voltage input both with attenuator, gain (pre-amplification).&lt;br&gt;Applications: voltage controlled mixing of up to 4 audio signals with separate control voltages. In connection with the Morphing-Controller A-144 the soft fade-over of 4 audio signals with only one control voltage is possible. A-135 also simplifies Shepard applications (A-191) as for each Shepard channel one VCA is required.</td>
<td>For each VCA:&lt;br&gt;• Audio In&lt;br&gt;• Gain&lt;br&gt;• CV In</td>
<td>For each VCA:&lt;br&gt;• Audio In&lt;br&gt;• CV In&lt;br&gt;common:&lt;br&gt;• Audio Out</td>
</tr>
<tr>
<td>A-136</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Distortion / Waveshaper</strong>&lt;br&gt;Distortion and waveshaping module with extensive control possibilities. The incoming signal is internally divided into 3 components:&lt;br&gt;• positive component with adjustable clipping level&lt;br&gt;• negative component with adjustable clipping lev.&lt;br&gt;• original signal&lt;br&gt;The 3 parts are mixed to the module output with adjustable amplification (positive and negative) for each component. Different settings of the 5 parameters enable a lot of very complex and extreme waveform modifications: from simple soft or hard clipping to completely altered waveforms</td>
<td>• Tune&lt;br&gt;• Attenuator&lt;br&gt;• Audio/VC2&lt;br&gt;• manual Trig.&lt;br&gt;• Gate (LED)&lt;br&gt;• 3 switches for mode control</td>
<td>• CV1 (tune)&lt;br&gt;• Audio In / CV2 (Wavetable)&lt;br&gt;• Audio Out&lt;br&gt;• Gate In&lt;br&gt;• MIDI In&lt;br&gt;• MIDI Out</td>
</tr>
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**Examples for the A-136 function when using a triangle as input signal**
Module Overview

**Analog Modular System A-100**

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<th>Module</th>
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<tr>
<td><strong>A-137-1</strong></td>
<td></td>
<td>Voltage Controlled Wave Multiplier I</td>
<td><em>Multiples (Man + CV)</em></td>
<td><em>CV Multiples</em></td>
</tr>
</tbody>
</table>
| Width: 14 HP | Current: 40 mA | multiplies the waveform of an audio signal (e.g. VCO triangle) within one period by folding and generates additional harmonics (kind of "inverse low pass"), the period time and consequently the pitch remains unchanged (in contrast to frequency multiplication with A-196); for all 4 parameters manual controls and CV inputs are available:  
*Multiples: number of waveform multiplications within one period*  
*Harmonics: Adding more harmonics (similar to filter resonance)* | *CV Folding Level* | *CV Symmetry* |
| **A-137-2** | | Voltage Controlled Wave Multiplier II | *Audio Level* | *Audio In* |
| Module A-137-2 is another version of a wave multiplier. In contrast to the A-137-1 Wavemultiplier I the A-137-2 generates four phase-shifted copies of a VCO signal (saw, triangle or sine waveform) applied to the audio input. The four shifted signals are added to the original signal to obtain a fat sound equivalent to five independent VCOs. For each of the four additional signals manual phase shift control and a CV input with attenuator is available. A suitable CV source is e.g. the Quad LFO A-143-3. Details about the working principle of the A-137-2 including sound examples are available on our website www.doepfer.com/A1372.htm. | *Manual Shift 1* | *CV Input 1* |
| Width: 14 HP | Current: 38 mA | | *Manual Shift 2* | *CV Input 2* |
| **A-138 a/b** | | Mixer | *Input 1* | *Input 1* |
| Width: 8 HP | Current: 10 mA | mixer with 4 inputs for Audio and CV signals; available in two versions:  
* A-138 a: linear potentiometers; mainly for mixing of CV signals*  
* A-138 b: logarithmic potentiometers; mainly for mixing of Audio signals output with attenuator (to adjust the output level if the module is the last module connected to a mixer/amplifier)*  
Offset option for control 1 (generates DC offset provided that no plug is inserted into input 1), can be deactivated with internal jumper | *Input 2* | *Input 2* |
| **A-138 c** | | Polarizing Mixer | *Input 1* | *Input 1* |
| Width: 8 HP | Current: 20 mA | four channel mixer, that allows to add or subtract four incoming voltages to the output signal with adjustable level (in the middle position of the corresponding control the amplification is zero; counterclockwise: signal is subtracted, clockwise: signal is added to the output sum); output control works in the same way; control In1 works as a DC offset generator (about -5V...+5V) provided that no patch cord is plugged into socket In1. Applications: mixing control voltages (e.g. ADSR, LFO) or audio signals with fixed phase relations Voltage controlled version of a polarizer: A-133 | *Input 3* | *Input 3* |
| **A-138 x** | | Mix Expander | *Input 1* | *Level 1* |
| Width: 8 HP | Current: 9 mA | expander module to expand the number of inputs of an A-138a/b by 5 (or 9 or 14), very simple module (only 5 sockets and potentiometers), due to the symmetry two front panel alignments are possible, as there was no majority for one of the two versions we offer the module only with a plain front panel, a bit of soldering is necessary to connect A-138x and A-138a/b (2 wires have to be soldered to the A-138a/b), a document on our website describes the connection, please specify if the version with linear (A-138x a) or logarithmic (A-138x b) potentiometers is required | *Input 2* | *Level 2* |
| | | | *Input 3* | *Level 3* |
| | | | *Input 4* | *Level 4* |
| | | | *Input 5* | *Level 5* |

Detailed information with graphical explanation and sound examples is available on our website www.doepfer.com/A138.htm.

www.doepfer.com

Technical data are subject to change
**Module Overview**

### A-138d
**Crossfader / FX Insert**
- **Description:**
  - Dual function module:
  - **Crossfader:** Two audio signals are connected to In 1 and In 2, the position of the CF (Crossfade) control defines the level relation between In 1 and In 2 that appear at Mix Output.
  - **FX Insert:** The A-100 signal to be processed by the external effect unit is connected to In 1. CF control is then a dry/wet control, the signal is attenuated by Atten. before it is output to FX Send (because some effect units will distort with A-100 levels), the output of the external effect unit is connected to the 1/4" socket FX Return. This socket is followed by an amplifier and the control Ampl. is used to amplify the signal to obtain again A-100 audio level. The output of the amplifier is normalized to the upper socket of Input 2. In this application no plug is inserted into the upper In 2 socket. The lower In 2 socket can be used to obtain the effect return signal before it is processed by the crossfade unit of the A-138d. The mute switch can be used to mute In 1 / original or In 2 / effect signal independent of the position of the crossfade control.

### A-138e
**Quad Three-Way Crossfader/Mixer/Polarizer**
- **Description:**
  - Four identical units that can be used for different crossfading, mixing and polarizing applications:
  - **Polarizer:** Only input A is used, B and C are unconnected.
  - **Crossfader:** Two signals connected to A and C result: crossfader between A and C, center: both signals same level.
  - **Two-way Crossfader:** Two signals connected to A and C, result: the control is used to attenuate A or B, center: no signal.
  - **Three-way Crossfader:** Three signals connected to A, B and C, result: the control defines the share of the signals A, B and C.
  - **Two-way Crossfader/Polarizer type:** Two signals connected to A and B, result: ccw = A, center = B, cw = inverted A, useful for CV mixing e.g. ADSR and LFO.

### A-138m
**4 x 4 Matrix Mixer**
- **Description:**
  - Matrix mixer with four rows (1 - 4) and four columns (A - D), switches for unipolar/bipolar mode for each column.
  - Unipolar means that the controls of the column in question work as attenuators. Bipolar means that the controls work as polarizers. In this mode the amplification is zero in the middle position of the corresponding control. Turning the knob counterclockwise from the center position the signal is subtracted from the output sum with increasing amount (i.e. negative). Turning the knob clockwise from the center position the signal is added to the output sum with increasing amount. As the module is DC coupled it can be used for both control voltages and audio signals.

### A-140
**ADSR - Envelope Generator**
- **Description:**
  - Standard envelope generator with 4 controls for attack, decay, sustain and release;
  - Gate and retrigger input (for multiple A-D-phases while gate is on);
  - 3-step switch for 3 time ranges:
  - Envelope duration ranges from about 50 microseconds up to several minutes;
  - Double normal and one inverted output envelope display with LED;
  - Gate input can be normalized to the bus.

### A-141
**VC ADSR - Voltage Controlled Envelope Generator**
- **Description:**
  - Voltage-controlled envelope generator with 4 controls for attack, decay, sustain and release;
  - Each parameter can be controlled manually as well as per control voltage at the corresponding CV input (with attenuator);
  - Gate and re-trigger input (for multiple A-D-phases while gate is on);
  - Envelope duration ranges from about 3 milliseconds up to several minutes (can be modified upon request even for shorter periods);
  - Envelope display with LED.
**Module Overview**

**Analog Modular System A-100**

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### A-142

- **Width:** 8 HP
- **Current:** 40 mA

**Description:**

- **VCD - Voltage Controlled Decay / Gate**
  - simple voltage-controlled envelope generator with only one parameter: decay
  - envelope duration ranges from a few milliseconds up to several seconds from the envelope signal a gate signal (normal and inverted) with adjustable threshold is derived, consequently one obtains additionally a gate signal with voltage controlled duration, with two A-142 a voltage controlled trigger delay can be realized

**Controls:**

- Decay
- CV
- Threshold
- Envelope LED
- Gate LED

**Inputs/Outputs:**

- Trigger In
- CV
- Envelope Out
- Gate Out
- Inverse Gate Out

---

### A-143-1

- **Width:** 28 HP
- **Current:** 70 mA

**Description:**

- **Complex Envelope Generator (Quad Attack-Decay Generator/LFO)**
  - four independent Attack-Decay generators that can be switched into LFO mode too, "end of attack" (EOA) output and comparator (CP) output with adjustable threshold, the sub-units are daisy-chained (CP outputs are normalled to the trigger input of the succeeding stage via normalled sockets), polarizing mixer for all AD/LFO signals, each AD generator/LFO can be used even separately, if the normalled sockets are interrupted, LED displays for envelope and comparator out

**Controls:**

- Range l/m/h
- Attack
- Decay
- Sustain
- Release
- Envelope Control (LED)

**Inputs/Outputs:**

- Gate In
- Retrigger In
- EOA Out
- EOD Out
- EOR Out
- Envelope Out (ADSR Out)

---

### A-143-2

- **Width:** 26 HP
- **Current:** 70 mA

**Description:**

- **Quad ADSR Generator**
  - four independent ADSR envelope generators, each sub-unit is equipped with
  - gate and retrigger inputs
  - "end of attack" output (EOA)
  - "end of decay" output (EOD)
  - "end of release" output (EOR)
  - 3-position range switch medium/high/low
  - Attack, Decay, Sustain and Release Control
  - envelope LED display
  - The gate inputs of all sub-units are normalled: Gate 1 Ü Gate 2 Ü Gate 3 Ü Gate 4

**Controls:**

- Gate In
- Retrigger In
- EOA Out
- EOD Out
- EOR Out
- Envelope Out (ADSR Out)

---

**More detailed information about the module is available on our web site**
<table>
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<tr>
<th>Module</th>
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</thead>
</table>
| A-143-3 | ![Sketch](image) | Quad LFO: four simple low-cost standard LFOs with frequency ranges from ~ one minute/cycle in low range up to moderate audio (some kHz) in high range, each of the four completely independent units is equipped with:  
- 3-position range switch medium/high/low  
- triangle output  
- rectangle output  
- sawtooth output  
- LED display | Range  
low/high/mid  
Frequency  
LFO display (LED) | Triangle Out  
Rectangle Out  
Sawtooth Out |
| A-143-9 | ![Sketch](image) | Quadrature LFO/VCO: the term "quadrature oscillator" means that sine and cosine outputs are simultaneously available, used e.g. for frequency shifter, special control voltage (crossequidocking/morphing) or FM synthesis applications, in addition the module has the inverted sine and cosine available, the four outputs can be treated as four sine waves with 0, 90, 180 and 270 degrees phase shift, a range switch is used to select three frequency ranges: slow LFO (minute range), LFO (Hz range), VCO (moderate audio up to some kHz), approx. 1V/Oct scale (not as exactly as a VCO)  
- Frequency  
- CV 2  
- L/H/M (range switch)  
+/- (control LEDs) | CV1 In  
CV2 In  
Sine Out  
Cosine Out  
Inverted Sine Out  
Inverted Cosine Out |
| A-144    | ![Sketch](image) | Morphing Controller: control voltage modifier, in the first place used in combination with the voltage controlled mixer A-135, from an increasing input voltage four displaced triangle output voltages are derived, when these outputs are connected to the CV inputs of an A-135 one obtains a fading over of the four A-135 audio inputs ("morphing"), morphing can be controlled manual and modulated with an external CV (e.g. from LFO, ADSR, Random, MIDI-to-CV, Theremin, sequencer) with attenuator. Applications: voltage controlled morphing of 4 audio sources in combination with A-135 (e.g. four different waveforms of a VCO, 6/12/24/48dB slope of A-108, four different filter outputs of a multimode VCF)  
- Manual  
- CV (attenuator) | CV In  
CV Out 1  
CV Out 2  
CV Out 3  
CV Out 4 |
| A-145    | ![Sketch](image) | LFO: modulation oscillator with 5 waveforms:  
- triangle  
- rectangle (symmetrical)  
- sine  
- rising and falling sawtooth (sawtooth has twice the frequency of the other outputs)  
- reset input for triggered wave start at zero  
3-step switch for 3 frequency ranges, from some minutes up to moderate audio range (max. 5kHz):  
2 LED's for frequency display of triangle/sine/rectangle and sawtooth  
- Frequency  
- Range  
(3-step switch)  
- 2x control LED | Reset In  
Triangle  
Sine  
Rectangle  
Saw Up  
Saw Down |
| A-146    | ![Sketch](image) | LFO 2: modulation oscillator with these waveforms: positive rectangle, symmetrical (around 0-line) rectangle, sawtooth/triangle, waveform control for continuously adjusting either the waveform from saw up to saw down over triangle or simultaneously the pulse width of the rectangle;  
3-step switch for 3 frequency ranges, from some minutes up to audio range (max. 5kHz):  
2 LED's for frequency display of pulse and sawtooth/triangle  
- Frequency  
- Range  
(3-step switch)  
- Waveform  
- 2x control LED | pos. rectangle  
sym. rectangle  
sawtooth / triangle |
Module Overview

**DOEPFER**

**Module** | **Sketch** | **Description** | **Controls** | **In/Outputs**
--- | --- | --- | --- | ---
A-147 |  | VC LFO  
Voltage-controlled modulation oscillator with 4 waveforms: triangle, square, sine and sawtooth;  
frequency can be controlled manually and via external control voltages at the two CV inputs (one with attenuator); frequency range about 50Hz to some minutes period  
3 LEDs for display of triangle/sine, square and sawtooth  
|  |  |  |  |  
A-148 |  | Dual S&H / T&H  
2 separate sample & hold / track & hold units for generating staircase-type control voltages in combination with other  
modulation sources (e.g. LFO, Random, ADSR, Theremin); the signal at the sample input is sampled and stored with each trigger signal (positive edge); output voltage display with 2 LED’s (positive/negative); for each sub-unit one can select with a jumper between S&H (output signal follows the input signal while the gate is high) or S&H (a sample is taken at the rising edge of the gate signal)  
|  |  |  |  |  
A-149-1 |  | A-149-1 Quantized/Stored Random Voltages  
Generates four analog random control voltages in the range 0...+5V generated in different ways. Advance to the next value is triggered by the rising edge of the corresponding clock input.  
Quantized Random Voltages: 2 outputs “N+1” and “2^N”, N is an integer number in the range 1...6 that can be adjusted with the manual control (Man N) and an external control voltage CVN, grid: 1V (N+1) resp. 1/12V (2^N)  
Stored Random Voltages: one output with even voltage distribution and second one with adjustable voltage distribution probability (D). The distribution probability D is adjusted by a manual control (Man D) and an external control voltage, 256 possible states for both outputs  
|  |  |  |  |  
A-149-2 |  | A-149-2: Digital Random Voltages  
Extension module for A-149-1, generates 8 digital random voltages (i.e. only low/high states like a gate signal) controlled by the Quantized Random Voltages section of the assigned A-149-1 and correspond to the 8 digital outputs of the shift register that is used to generate the Quantized Random Voltages  
|  |  |  |  |  
A-150 |  | Dual VCS - Voltage Controlled Switches  
2 voltage controlled switches (change-over type); each switch has a control input, a common output/input and 2 separate input/outputs (bidirectional function, i.e. in’s and out’s are interchangeable); 2 LED’s display the active input/output; digital level of the control signal determines switch position (‘low’: I/O 1 connected to common O/I, ‘high’: I/O 2 connected to common O/I); voltage range for the switched signals is -12...+12V  
|  |  |  |  |  
A-151 |  | Sequential Switch  
“Electronical rotary switch” with one common input/output and 4 single outputs/inputs (bidirectional function, i.e. in’s and out’s are interchangeable); each trigger pulse advances switch to the next position; display of the active I/O by 4 LED’s; reset input (‘high’ resets to I/O 1); voltage range for the switched signals is -12...+12V, the number of steps can be limited to 2, 3 or 4 with a three-position toggle switch (for version 2)  
|  |  |  |  |  
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More detailed information about the module is available on our web site

www.doepfer.com  
Technical data are subject to change  
page 19
### Module Overview

**A-155**
- **Analog and Trigger Sequencer**
  - **Description**
    - Sequencer generating analog control voltages and trigger signals
    - 8 steps with LED display of the current selected step
    - 3 trigger rows + 1 gate row controlled by 2 rows of 8 three-position switches (1-0-1)
    - LED displays for the 3 trigger rows and the gate row
    - 2 analog rows with 8 potentiometers
    - S&H and Glide features for the analog rows with ext. control inputs for S&H on/off and Glide on/off
    - analog row 1 with fixed ranges 1V/2V/4V (especially for VCO control)
    - analog row 2 with variable range knob and optional 8 external inputs instead of fixed voltages (suitable for audio or control signals)
    - pre and post S&H/Glide analogue outputs
    - manual (button) and external (jack sockets) control of Start, Stop, Step and Reset

**A-154**
- **A-154: Sequencer Controller**
  - **Expansion module for the sequencer A-155 for additional functions:**
    - running modes: forward, backward, pendulum, random and voltage controlled addressing
    - all modes even as "one shot" available (except CV addressed mode)
    - LED display of selected mode
    - manual/voltage controlled mode selection
    - voltage controlled first/last step
    - in the voltage controlled addressing mode the active sequencer step is defined by the first step section, manual and voltage control of step position in this mode

**A-152**
- **Voltage Addressed S&H/Switch**
  - **Description**
    - A control voltage (manually and CV) defines an address 1...8 that is used to address three different subunits: 8-fold Sample&Hold, elektronical rotary switch, digital output.
    - S&H: The voltage at the common S&H input is passed on to the addressed S&H output and stored at this output as soon as a new address is generated. Switch: The common terminal is connected to the currently addressed terminal (bi-directional).
    - Digital out: The currently addressed output is high (~ +12V) and the corresponding LED is on. The remaining 7 outputs are low.
    - Instead of CV controlled addressing even Clock/Reset control is possible. CV has to remain unchanged in this mode.

---

**Module** | **Sketch** | **Description** | **Controls** | **In/Outputs**
--- | --- | --- | --- | ---
**A-155** | | **Analog and Trigger Sequencer** | | **Module Overview**

**A-154** | | **A-154: Sequencer Controller** | | **Module Overview**

**A-152** | | **Voltage Addressed S&H/Switch** | | **Module Overview**

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**More detailed information about the module is available on our web site.**
### Module Overview

#### Analog Modular System A-100

**A-156**
- **Width:** 8 HP
- **Current:** 50 mA

**Dual-Quantizer**
2 quantizers in one module, first quantizer semitone mode (+1/12V quantizing steps), the second quantizer has some special modes: chromatic/major/minor/ major chord/minor chord selection (optionally also for quantizer 1 via jumper), common transpose input for both quantizers, especially designed for A-155 expansion, but also suitable for other CV input signals, e.g. Ribbon/Trautonium Controller, Theremin, Light-controlled CV, Random, LFO, Foot controller CV and so on for glissando and arpeggio like effects
- **Controls:** 3 mode switches
- **In/Outputs:** CV In 1
  - CV Out 1
  - Trig In 1
  - Trig Out 1
  - CV In 2
  - CV Out 2
  - Trig In 2
  - Trig Out 2
  - CV Common (Transpose)

**A-160**
- **Width:** 4 HP
- **Current:** 40 mA

**Clock Divider**
frequency divider especially for clock/gate/trigger signals, for example if lower (i.e. divided) clock frequencies are required in the system for synchronising purposes; especially for rhythmic sounds, the clock input may be supplied from a MIDI-to-SYNC interface (for MIDI synchronised timing) or from an LFO output; a pulse at the reset input resets all outputs to zero (e.g. reset or start/stop output from MIDI-SYNC interface)
- **Controls:** /2 (LED), /4 (LED), /8 (LED), /16 (LED), /32 (LED), /64 (LED)
- **In/Outputs:** Trigger In
  - Reset In
  - /2
  - /4
  - /8
  - /16
  - /32
  - /64

**A-161**
- **Width:** 4 HP
- **Current:** 20 mA

**Clock Sequencer**
expansion module for A-160; supplies 8 single step outputs (step 1...8) which are advanced to the next step in the rhythm of the A-160 clock signal; A-160 is required and must be placed side by side with the A-161; typical application: sequential rhythmic control of ADSR (A-140) or AR generators (A-170); in combination with a mixer (e.g. A-138a with expander A-138xa) a miniature analog sequencer can be realized
- **Controls:** 1 (LED), 2 (LED), 3 (LED), 4 (LED), 5 (LED), 6 (LED), 7 (LED), 8 (LED)
- **In/Outputs:** Out 1
  - Out 2
  - Out 3
  - Out 4
  - Out 5
  - Out 6
  - Out 7
  - Out 8

Requires A-160 next to the A-161!

**A-162**
- **Width:** 8 HP
- **Current:** 40 mA

**Dual Trigger Delay**
2 separate trigger delay units; for each unit the delay time and gate time (width of the gate pulse at the output) are adjustable in the range of about 0 ... 10 sec; output display with LED
A voltage controlled version of the trigger delay can be realized with two A-142 VC Decay modules
- **Controls:** Delay Time, Length, Control (LED)
- **In/Outputs:**
  - In
  - Out

**A-163**
- **Width:** 8 HP
- **Current:** 40 mA

**A-163 Voltage Contr. Div.**
frequency of the input signal (e.g. rectangle from a VCO) is divided by an integer factor N (1 ... 20). N can be adjusted manually and modulated with an external control voltage (e.g. LFO, ADSR, Random, Theremin, sequencer) with attenuator. Output waveform is symmetric rectangle. In contrast to A-113 the dividing factor of the A-163 is voltage controlled.
Applications: dynamic voltage controlled frequency division of audio signals (you will find more details regarding frequency division of audio signals in the A-113 information).
- **Controls:** Manual N, CV (attenuator)
- **In/Outputs:** CV In
  - Audio In (rectangle)
  - Audio Out

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**Module Sketch Description**

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<td>![A-163 Sketch]</td>
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<tr>
<td><strong>A-161</strong></td>
<td>![A-161 Sketch]</td>
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<tr>
<td><strong>A-160</strong></td>
<td>![A-160 Sketch]</td>
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<tr>
<td><strong>A-156</strong></td>
<td>![A-156 Sketch]</td>
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**Technical data are subject to change**
### Analog Modular System A-100

#### Module Overview

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<tr>
<td>A-164-1</td>
<td></td>
<td><strong>Manual Gate</strong>&lt;br&gt;3 momentary push buttons generate three gate signals (+12V while button is operated, 0V when released), Gate 1 is different: if any signal (e.g. rectangle output of an LFO) is connected to the input socket the gate button 1 is working as a momentary on/off switch that turns the signal on/off, each Gate output has two sockets available, an internal jumper can be used to connect Gate 1 or Gate 2 to the gate line of the internal A-100 bus, that way the module can be used to trigger one or more envelope generators (ADSR A-140) that are connected to the bus.</td>
<td>• &quot;1&quot;&lt;br&gt;• &quot;2&quot;&lt;br&gt;• &quot;3&quot;&lt;br&gt;  (momentary switches)</td>
<td>• In 1 (2x)&lt;br&gt;• Gate Out 1 (2x)&lt;br&gt;• Gate Out 2 (2x)&lt;br&gt;• Gate Out 3 (2x)</td>
</tr>
<tr>
<td>A-165</td>
<td></td>
<td><strong>Dual Trigger Modifier</strong>&lt;br&gt;2 separate trigger modifiers; each with 2 connected inputs for logic signals (gate, clock, trigger) and 2 outputs; the first output provides the inverted signal ('low' is changed into 'high' and vice versa); the second output generates short trigger pulses for each rising and falling edge of the input signal; 2 LED's for display of output signals per Modifier:&lt;br&gt;• LED for inverse output&lt;br&gt;• LED for +/- pulse output</td>
<td>per Modifier:&lt;br&gt;• 2x In&lt;br&gt;• Inverse Out&lt;br&gt;• +/- Out</td>
<td></td>
</tr>
<tr>
<td>A-166</td>
<td></td>
<td><strong>Logic Module</strong>&lt;br&gt;Dual logic module with 3 inputs per unit, the logic states of the 3 inputs are linked together in 3 ways: AND, OR and EXOR (exclusive OR). The three functions are available simultaneously at three outputs with LED display of the output states. Additionally two inverter sections are available to obtain the inverted functions (NAND, NOR and NEXOR). Applications: combination of digital signals of the A-100 (e.g. gates, clocks, triggers), e.g. to obtain &quot;gated&quot; clocks or certain rhythmic patterns each unit:&lt;br&gt;• AND (LED)&lt;br&gt;• OR (LED)&lt;br&gt;• EXOR (LED) each inverter:&lt;br&gt;• LED</td>
<td>each unit:&lt;br&gt;• IN1&lt;br&gt;• IN2&lt;br&gt;• IN3&lt;br&gt;• AND (OUT)&lt;br&gt;• OR (OUT)&lt;br&gt;• EXOR (OUT) each inverter:&lt;br&gt;• IN&lt;br&gt;• OUT</td>
<td></td>
</tr>
<tr>
<td>A-167</td>
<td></td>
<td><strong>Analog Comparator</strong>&lt;br&gt;compares analog voltages and derives a gate signal; internally the module generates the voltage ( k_1*('+In) - k_2*(-In) + \text{Offset} ) (available at the output analog sum) and und sets or resets the gate output depending on the result of this internal voltage (&gt;0V or &lt;0V). ( k_1 ) and ( k_2 ) represent the manual attenuators. A LED shows gate state. The Gap control is used to adjust a so-called &quot;hysteresis&quot; (i.e. the difference between on and off level). As soon as the Gap control is turned up the switching levels for on and off state fall apart. Appl.: gate gener. from analog signals, ADSR-LFO</td>
<td>• + In&lt;br&gt;• - In&lt;br&gt;• Offset&lt;br&gt;• Gap&lt;br&gt;• Function (LED)</td>
<td>• + In&lt;br&gt;• - In&lt;br&gt;• Analog Sum&lt;br&gt;• Comp. Out&lt;br&gt;• Inv. Comp. Out</td>
</tr>
<tr>
<td>A-170</td>
<td></td>
<td><strong>Dual Slew Limiter SL</strong>&lt;br&gt;2 separate slew limiters (portamento controllers, AR generators)</td>
<td><strong>Unit 1:</strong>&lt;br&gt;• Time&lt;br&gt;• 2x Control-LED&lt;br&gt;<strong>Unit 2:</strong>&lt;br&gt;• Rise Time&lt;br&gt;• Fall Time&lt;br&gt;• Time Range&lt;br&gt;• 2x Control-LED</td>
<td><strong>Unit 1:</strong>&lt;br&gt;• In&lt;br&gt;• Out&lt;br&gt;<strong>Unit 2:</strong>&lt;br&gt;• In&lt;br&gt;• Out</td>
</tr>
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**Technical data are subject to change**

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### Module Overview

#### Analog Modular System A-100

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<tr>
<td>A-171</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Voltage Controlled Slew Limiter</strong> (VCSL)</td>
<td>• Slew Time&lt;br&gt;• CV &lt;br&gt;• 2x Control-LED</td>
<td>• Slew Time&lt;br&gt;• CV 1&lt;br&gt;• CV 2&lt;br&gt;• 2x Signal In&lt;br&gt;• Out</td>
</tr>
<tr>
<td>A-172</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>A-172: Max/Min Selector</strong>&lt;br&gt;The module permanently picks the maximum resp. minimum voltage out of the four input signals and outputs these voltages to the maximum resp. minimum jack socket.&lt;br&gt;The main application of the module is the processing/mixing of control voltages, e.g. random voltages, ADSR, LFO, S&amp;H, ribbon CV, theremin-CV and similar - or the generation of new VCO waveforms by using the outputs of a VCO as A-172 inputs. To adjust offset and amplitude for each input independently we recommend to combine the module with the A-129-3. The sketch shows the basic principle of the max/min module by means of three sine waves (e.g. three LFOs) with different frequencies and different levels.&lt;br&gt;• Max display&lt;br&gt;• Min display</td>
<td>• In 1 ... 4&lt;br&gt;• Max Out&lt;br&gt;• Min Out</td>
<td></td>
</tr>
<tr>
<td>A-174-1</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Joystick</strong>&lt;br&gt;spring-loaded X/Y cross potentiometer (so-called joy stick) that generates 2 independent control voltages, max. voltage difference about 7V (i.e. -3.5 ... +3.5V for symmetrical adjustment) for each output the voltage offset (zero setting) can be adjusted, 2 LEDs for positive/negative display of the output voltages.&lt;br&gt;If the spring is removed for one direction the joy stick is no longer spring-loaded for this direction (as the spring is destroyed when removed this cannot be re-established !), a high quality joy stick made by ALPS is used</td>
<td>• Joystick&lt;br&gt;• X-Offset&lt;br&gt;• Y-Offset&lt;br&gt;• -Y (LED)&lt;br&gt;• +Y (LED)&lt;br&gt;• -X (LED)&lt;br&gt;• +X (LED)</td>
<td>• CV Y&lt;br&gt;• CV X</td>
</tr>
<tr>
<td>A-174-2</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Pitch Bend/Modulation</strong>&lt;br&gt;left wheel without spring (no self-center function), voltage range about 0...+5V&lt;br&gt;right wheel is spring-loaded (i.e. self-center function), voltage range about -3 ... +3V&lt;br&gt;internal jumpers for unipolar/bipolar voltage range and voltage plateau around 0V (required for pitch bend because of mechanical tolerances) independent for both wheels, available upon request even with both wheels with or without springs, additional 4 HP blind panel on left side required (or module with sufficient space, e.g. A-174-1)</td>
<td>• Wheel 1&lt;br&gt;• Wheel 2</td>
<td>• Out 1 2x&lt;br&gt;• Out 2 2x</td>
</tr>
<tr>
<td>A-175</td>
<td><img src="image" alt="Sketch" /></td>
<td><strong>Dual Voltage Inverter</strong>&lt;br&gt;2 separate inverters for analog voltages (e.g. a voltage of +5 V is changed to -5 V, a voltage of -3 V is changed to +3 V, etc.); each inverter has two connected inputs and one output; 2 LED's at each output display output voltage (positive/negative)</td>
<td>per Inverter:&lt;br&gt;• 2 x In (connected)&lt;br&gt;• Inverse Out</td>
<td>per Inverter:&lt;br&gt;• + / - LED's</td>
</tr>
<tr>
<td>Module</td>
<td>Sketch</td>
<td>Description</td>
<td>Controls</td>
<td>In/Outputs</td>
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<tr>
<td>A-176</td>
<td><img src="image" alt="A-176 Sketch" /></td>
<td><strong>Control Voltage Source CVS</strong>&lt;br&gt;provides 3 manually adjustable control voltages, 2 of them having an additional <em>fine</em> control (e.g. for exact tuning of VCO frequency)</td>
<td>• CV 1 &lt;br&gt;• CV 1 fine &lt;br&gt;• CV 2 &lt;br&gt;• CV 2 fine &lt;br&gt;• CV 3</td>
<td>• 2x CV 1 &lt;br&gt;• 2x CV 2 &lt;br&gt;• CV 3</td>
</tr>
<tr>
<td>A-177-1</td>
<td><img src="image" alt="A-177-1 Sketch" /></td>
<td><strong>External Foot Controller I</strong>&lt;br&gt;interface for connection of external controllers, inputs for 2 continuous foot controllers (e.g. Doepfer FP5) and 1 double foot switch (e.g. Doepfer VCP2), adjustable scale (range) for the continuous foot controllers, LED displays for CV and Gate outputs&lt;br&gt;applications: foot control of any CV (e.g. filter frequency, loudness, panorama) or Gate/Clock, in combination with the A-113 foot controlled switching of the subharmonic mixtures</td>
<td>• Scale 1 &lt;br&gt;• Scale 2 &lt;br&gt;• CV1 (LED) &lt;br&gt;• CV2 (LED) &lt;br&gt;• Gate 1 (LED) &lt;br&gt;• Gate 2 (LED)</td>
<td>• Foot Ctr. 1 In &lt;br&gt;• 2 x CV 1 Out &lt;br&gt;• Foot Ctr. 2 In &lt;br&gt;• CV 2 Out &lt;br&gt;• Double Foot Switch In &lt;br&gt;• Gate 1 Out &lt;br&gt;• Gate 2 Out</td>
</tr>
<tr>
<td>A-177-2</td>
<td><img src="image" alt="A-177-2 Sketch" /></td>
<td><strong>External Foot Controller II</strong>&lt;br&gt;economically priced foot controller interface&lt;br&gt;one 1/4&quot; input for continuous foot controller (e.g. Doepfer FP5), continuous CV output range about 0 ... +6V, one 1/4&quot; input for double foot switch (e.g. Doepfer VFP2), voltage range for the two switched outputs 0/+10V&lt;br&gt;applications: foot control of any CV (e.g. filter frequency, loudness, panorama) or Gate/Clock, in combination with the A-113 foot controlled switching of the subharmonic mixtures</td>
<td>• foot control input (1/4&quot;) &lt;br&gt;• foot control output (2 x 3.5 mm) &lt;br&gt;• double foot switch input (1/4&quot;) &lt;br&gt;• 2 x foot switch output (3.5 mm)</td>
<td></td>
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<tr>
<td>A-178</td>
<td><img src="image" alt="A-178 Sketch" /></td>
<td><strong>Theremin Module THER</strong>&lt;br&gt;control voltage module which generates a voltage that depends upon the distance between the Antenna and the hand of the user, used to control e.g. VCO, VCA, VCF or any other parameter in the A-100 which is voltage controlled, distance range about 30cm, gate output with adjustable threshold (e.g. for triggering envelope generator), adjustable CV offset (zero), price includes telescope antenna, to obtain exact intervals (semitone, major/minor, chords) a quantizer (A-156) is recommended, to simulate the original Theremin 2 x A-178, 1 x A-110 and 1 x A-130 are required</td>
<td>• CV offset &lt;br&gt;• Gate threshold &lt;br&gt;• 2xCV LED (pos./neg.) &lt;br&gt;• Gate LED</td>
<td>• Antenna In &lt;br&gt;• 2x CV out &lt;br&gt;• Gate out</td>
</tr>
<tr>
<td>A-179</td>
<td><img src="image" alt="A-179 Sketch" /></td>
<td><strong>Light Controlled CV Source LCV</strong>&lt;br&gt;control voltage module similar to Theremin (A-178) but the generated control voltage depends upon the illumination of the built-in light sensor, instead of the internal sensor an external sensor (LDR) may be connected via cable. In this case the internal sensor is turned off. Functions very similar to A-178, but additional inverted CV Output with control LEDs available</td>
<td>• Light sensor &lt;br&gt;• CV Offset &lt;br&gt;• Threshold &lt;br&gt;• 2xLED &lt;br&gt;• norm. CV Out (pos./neg.) &lt;br&gt;• 2xLED &lt;br&gt;• inv. CV Out (pos./neg.) &lt;br&gt;• Gate LED</td>
<td>• ext. Sensor In &lt;br&gt;• CV Out &lt;br&gt;• inverted CV Out &lt;br&gt;• Gate Out</td>
</tr>
</tbody>
</table>

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<th>In/Outputs</th>
</tr>
</thead>
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<tr>
<td>A-180</td>
<td></td>
<td><strong>A-180: Multiples 1</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>A-180 Multiple 1: 8 connected jacks</td>
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<td></td>
<td></td>
<td>may be divided into 2 x 4 jacks optionally</td>
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<tr>
<td>A-181</td>
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<td><strong>A-181: Multiples 2</strong></td>
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<tr>
<td></td>
<td></td>
<td>1/4&quot; - 3.5mm multiple, 2 separate multiples with one 1/4&quot;</td>
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<tr>
<td></td>
<td></td>
<td>and two 3.5mm jack sockets, one is wired mono, the second stereo</td>
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<tr>
<td>A-182-1</td>
<td></td>
<td><strong>Switched Multiple</strong></td>
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<td></td>
<td>simple passive multi-connector similar to the multiples module A-180, in</td>
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<td>contrast to module A-180 each socket is equipped with a 3-position switch</td>
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<td></td>
<td></td>
<td>that allows to connect the corresponding socket to the internal line #1</td>
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<td></td>
<td></td>
<td>(left), line #2 (right) or to turn the socket off (center), some examples:</td>
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<td></td>
<td></td>
<td>- all switches left (or right): 8-fold multiple</td>
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<td>- four switches left, four switches right: two 4-fold multiple</td>
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<td>- X switches left, Y switches right, Z switches center: two separate</td>
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<td></td>
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<td>multiples with some sockets turned off</td>
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<tr>
<td>A-183-1</td>
<td></td>
<td><strong>Dual Attenuator</strong></td>
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<tr>
<td></td>
<td></td>
<td>two simple passive attenuators with one input and one output, 50k linear</td>
<td></td>
<td>Level 1</td>
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<tr>
<td></td>
<td></td>
<td>potentiometers, no active parts like amplifiers or buffers and therefore</td>
<td></td>
<td>Level 2</td>
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<tr>
<td></td>
<td></td>
<td>no power supply is required</td>
<td></td>
<td>In 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>release date: ~ summer 2009</td>
<td></td>
<td>Out 1</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>In 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Out 2</td>
</tr>
<tr>
<td>A-183-2</td>
<td></td>
<td><strong>Offset Generator/Polarizer/Atten.</strong></td>
<td></td>
<td>Offset</td>
</tr>
<tr>
<td></td>
<td></td>
<td>simple voltage offset generator combined with an attenuator/polarizer, a</td>
<td></td>
<td>In</td>
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<tr>
<td></td>
<td></td>
<td>switch is used to select between Attenuator or Polarizer function for the</td>
<td></td>
<td>Out (2x)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>input control, the output is a DC voltage that is adjusted with the</td>
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<td></td>
<td></td>
<td>Offset control (0...+5V/-5V...+5V jumper selectable). It is overlaid by the</td>
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<td></td>
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<td>attenuated/ polarized voltage that is fed to the In socket. Attenuator</td>
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<td>mode: control works as an usual attenuator,</td>
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<td>Polarizer mode: zero level appears at the center position,</td>
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<td>right from center the signal is added to the DC, left from center the</td>
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<tr>
<td></td>
<td></td>
<td>signal is subtracted from the DC offset.</td>
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<tr>
<td>A-183-3</td>
<td></td>
<td><strong>Amplifier</strong></td>
<td></td>
<td>Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>simple DC coupled amplifier, suitable for CV and audio signals, the</td>
<td></td>
<td>Maximal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>maximal amplification can be switched between</td>
<td></td>
<td>Amplification (Toggle Switch)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1, 2 and 4, the actual level is adjusted by means of the Level control</td>
<td></td>
<td>Overload (2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>between zero and the chosen maximal amplification</td>
<td></td>
<td>LEDs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1/2/4), two overload LEDs indicate if the output signal exceeds +10V/-10V</td>
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<td></td>
<td></td>
<td>main application: adaption of differing audio or CV levels</td>
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<td>between modules or systems (e.g. LFO, ADSR or Gate levels between modules</td>
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<tr>
<td></td>
<td></td>
<td>of different manufacturers). Even audio signals can be attenuated/amplified</td>
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<tr>
<td></td>
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<td>but the module is not planned as an amplifier for external low level audio</td>
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<tr>
<td></td>
<td></td>
<td>signals (e.g. microphones or electric guitars)</td>
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### Effect Name

<table>
<thead>
<tr>
<th>Effect Number</th>
<th>Effect Name</th>
<th>Parameter 1</th>
<th>Parameter 2</th>
<th>Parameter 3</th>
<th>Parameter 4</th>
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<tbody>
<tr>
<td>1</td>
<td>Bypass (no effect)</td>
<td>nc</td>
<td>nc</td>
<td>nc</td>
<td>nc</td>
</tr>
<tr>
<td>2</td>
<td>Reverb, shortroom</td>
<td>Volume</td>
<td>Pre-Delay</td>
<td>Time</td>
<td>Hdfamp</td>
</tr>
<tr>
<td>3</td>
<td>Gate, Gated Rev.</td>
<td>Volume</td>
<td>Pre-Delay</td>
<td>Time</td>
<td>Hdfamp</td>
</tr>
<tr>
<td>4</td>
<td>Echo, Mono Echo</td>
<td>Volume</td>
<td>Time</td>
<td>Feedback</td>
<td>Hdfamp</td>
</tr>
<tr>
<td>5</td>
<td>Chorus, Chorus Light</td>
<td>Delay</td>
<td>Time</td>
<td>Feedback</td>
<td>Rate Depth</td>
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<tr>
<td>6</td>
<td>Flanging, Flanging Light</td>
<td>Delay</td>
<td>Time</td>
<td>Feedback</td>
<td>Rate Depth</td>
</tr>
<tr>
<td>7</td>
<td>Delay, 150ms Delay</td>
<td>Time</td>
<td>Feedback</td>
<td>Rate</td>
<td>Depth</td>
</tr>
<tr>
<td>8</td>
<td>Distortion, Tube Dist Low 1</td>
<td>Distortion Depth</td>
<td>LP filter</td>
<td>Filter res.</td>
<td>Filter input amplitude</td>
</tr>
<tr>
<td>9</td>
<td>Guitar Pitchshift, Up M 3rd</td>
<td>Pitch Shift coarse</td>
<td>Filter</td>
<td>Reson.</td>
<td>Signal balance(1)</td>
</tr>
<tr>
<td>10</td>
<td>Mike Pitchshift, Male voice</td>
<td>Pitch Shift coarse</td>
<td>Pitch Shift fine</td>
<td>Filter</td>
<td>Signal balance(1)</td>
</tr>
<tr>
<td>11</td>
<td>Delay + Reverb, Delay(Echo) + Vocal Plate</td>
<td>Delay</td>
<td>Feedback</td>
<td>Level</td>
<td>Time</td>
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<tr>
<td>12</td>
<td>Chorus + Reverb, Chorus + Room</td>
<td>Delay</td>
<td>Feedback</td>
<td>Level</td>
<td>Time</td>
</tr>
<tr>
<td>13</td>
<td>Flange + Reverb, Flange + Short room</td>
<td>Delay</td>
<td>Feedback</td>
<td>Level</td>
<td>Time</td>
</tr>
<tr>
<td>14</td>
<td>Chorus + Delay, Echo 1</td>
<td>Delay</td>
<td>Feedback</td>
<td>Time Echo</td>
<td>Feedback</td>
</tr>
<tr>
<td>15</td>
<td>Flange + Delay, echo 1</td>
<td>Delay</td>
<td>Feedback</td>
<td>Time Echo</td>
<td>Feedback</td>
</tr>
<tr>
<td>16</td>
<td>Pitch Shift Special, Octave Down + FX Pitch</td>
<td>Delay</td>
<td>Feedback</td>
<td>Signal balance(1)</td>
<td>Time Echo</td>
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<tr>
<th>Module</th>
<th>Sketch</th>
<th>Description</th>
<th>Controls</th>
<th>In/Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-188-1</td>
<td>BBD Module (see A-109 ff.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-188-2</td>
<td>Tapped BBD Module (see A-109 ff.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-189-1</td>
<td>Voltage Controlled Bit Modifier</td>
<td>The module offers several voltage controlled bit modification functions like voltage controlled bit crunching, bit shifting, bit exchange, digital ring modulator and others. It has two units with manual control and CV input with attenuator. One for the bit manipulation function (e.g. bit crunching) and another for the sampling rate (SR and SR CV). The signal input is equipped with an attenuator. As the module is DC coupled even control voltages can be processed. The mode (e.g. bit crunching, bit shifting, bit exchange) is selected by a 16-position rotary switch.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| A-190-1   | MIDI-CV/Gate/Clock Interface | - first CV outputs with 12 bits resolution for VCO CV, controlled by MIDI note on and pitch bend  
- second CV output with 7 bits resolution for control applications, controlled by MIDI velocity or controller or after touch (adjustable)  
- Gate output, controlled by note on/off, retrigger on/off option  
- Clock and Start/Stop output controlled by MIDI clock/start/stop/continue  
- all parameters are adjusted with the controls at the front panel (even scale, no trimmers)  
- MIDI controlled LFO and glide (software) | | |
| A-190-2   | Low Cost MIDI-CV/Gate Interface | - economically priced MIDI-to-CV/Gate interface  
- modular version of the MCV4  
- CV note (controlled by note messages)  
- CV pitch (controlled by pitch bend messages)  
- CV velocity/volume  
- CV controller (free assignable)  
- glide control for CV1  
- gate output with LED display  
- easy programming of Midi channel, reference note and assignable controller via learn button  
- jumpers for CV/Gate to A-100 bus | | |
| A-190-3   | Polyphonic MIDI-CV/Gate Interface | four voice MIDI-to-CV/Gate interface, for each voice a pitch control voltage (CV1, 1V/oct. used to control VCOs), a gate output and two additional control voltages (CV2, CV3) are available (probably controlled by velocity/volume and a free assignable Midi controller), the basic mode is selected by means of a rotary switch. These modes are planned (without obligation): unisono, four voice monophonic, several four voice polyphonic (with different assign algorithms), a learn button with LED is used to select the Midi channel and the reference note for 0V CV, CV ranges are 0...+5V, gate voltage is 0/+5V | | |
| A-192     | A-192 Voltage-to-MIDI Interface | converts 16 control voltages 0...+5V into MIDI controllers (= modular version of Pocket Control), 128 different sets of MIDI controllers (presets) available via DIP switch on the pc board. MIDI-In, MIDI-Out/Thru with setting, snapshot button, LED control. For details please refer to the description of Pocket Control on our web site. Applications: conversion of control voltages into MIDI controllers, e.g. Theremin/Light/Sequencer/Foot-Contr./LFO/Random-to-MIDI or as MIDI Interface for Vocoder (A-129/1 -> A-192 -> MIDI-Equipment -> A-191 special version -> A-129/2); | | |

Executive and Design: Peter Glaeser  
Technical data are subject to change  
www.doepfer.com
### Module A-196

**Description:**
PLL (Phase Locked Loop)

Linear VCO with so-called phase locked loop circuit (PLL); where the frequency of the internal VCO tries to follow the frequency of an external signal.

**Internal construction:** VCO + phasen detector (frequency comparator) + low pass that smoothes the output of the detector and feeds the VCO with this voltage.

The internal signal are normald via the switching contacts of the sockets but even available as in/outputs.

The functions of the module are very complex and not very easy to understand for beginners because of the closed loop system with several parameters. Beside the "classic" PLL application the module invites to experiment by changing all the PLL parameters (filter frequency of the low pass, detector type, VCO range) to find out the results.

Even the insertion of other modules is possible. E.g. with the A-163 voltage controlled frequency multiplication is possible (sort of VC harmonics). Inserting a VC slew limiter allows voltage control of the "delay" time or "portamento" of the internal VCO.

**Applications:** special sound effects, frequency multiplication, generation of clock signals for graphic VCO (e.g. high speed VCO für A-155) or switched-capacitor filters

<table>
<thead>
<tr>
<th>Controls</th>
<th>In/Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCO:</td>
<td>CV In</td>
</tr>
<tr>
<td>Range</td>
<td>Out Detector:</td>
</tr>
<tr>
<td>Detector:</td>
<td>In 1</td>
</tr>
<tr>
<td>Low Pass:</td>
<td>In 2</td>
</tr>
<tr>
<td>Frequency</td>
<td>Out</td>
</tr>
<tr>
<td>Low Pass:</td>
<td>Out</td>
</tr>
</tbody>
</table>

**Technical data:**

- **Width:** 8 HP
- **Current:** 80 mA

---

### Module A-197-2

**Description:**

A-197-2 LCD Scope

This is not a ready built module but only a kit that can be used to mount a LCD scope Velleman VPS10 to the A-100. It contains a suitable punched front panel with a multiple (A-180) mounted below the LCD and all cables required to supply the scope from the A-100 power supply. The right four sockets work as scoppy measuring input and multiple. The LCD scope is not included and has to be added by the customer!

The scope can be supplied even by a separate power supply to save the high quality voltage/current of the A-100 supply.

**Technical data:**

- **Width:** 34 HP
- **Current:** 300 mA

---

### Module A-198

#### Module A-198 Trautonium/Ribbon Manual

**Description:**

Play manual modeled on the Trautonium; made of a very sensitive position sensor that is activated by touching the sensor with the finger. It generates a voltage that is changed by moving the finger. Below the position sensor the pressure sensor is located. It is much less sensitive and generates a voltage that depends upon the pressure generated by the finger. For both voltages the scale can be adjusted and two gate signals are derived (with adjustable threshold for the pressure section).

For the position section a hold function is available (switch). If this is activated the voltage is held some time after removing the finger. No gate signal is generated in the hold mode.

The complete unit consists of manual and module.

**Technical data:**

- **Width:** 24 HP
- **Current:** 80 mA

---

### Module A-199

**Description:**

A-199 Spring Reverb

Electronically simulated reverb by means of 3 spiral springs, characteristic sound based on the mechanical properties of the springs (delays, resonances, frequency range, sensitivity to mechanical shocks). "Dense" reverb due to the 3 springs.

Feedback: signal can be fed back to the input, even "spring self-oscillation" available, option for inserting ext. modules (VCA, VCF, phaser, frq.shifter...) into the feedback loop;

Emphasis: enables the adjustment of the accentuation of middle frequencies around 2kHz;

Mix: relation between original and reverb signal

**Technical data:**

- **Width:** 8 HP
- **Current:** 80 mA

---

Detailed information about the module including sound and patch examples is available on our web site.

---

Technical data are subject to change

www.doepfer.com
Product | Sketch | Description
--- | --- | ---
A-100G6 | Rack Mountable Basic Frame 6U/84HP: empty 19” rackmount case (subrack), width about 482 mm, height about 264 mm, depth about 240 mm, includes two bus boards, one power supply +/-12 V/1200 mA, mains inlet, fuse and power switch, rear, top and bottom covers, incl. all mechanical parts, completely assembled and tested, for plug-in of the desired modules, 2 x 84 HP effective width (about 2 x 426.7 mm), 2 bus boards, back panel 3U (blind), 1 back panel 3U with power supply, used for A-100 basic system 1 and 2.
A-100P6
A-100P9 | Portable Suitcase Versions 6U and 9U/84HP: Portable version of A-100G6, available with 6U (2x3U) and 9U (3x3U), measures: about 480 mm (width) x 330/485 mm (height 6U/9U) x 210/175 mm (depth with/without cover), includes two (6U) or three (9U) bus boards, one power supply +/-12 V/1200 mA, mains inlet, fuse and power switch at the rear panel, completely assembled and tested, for plug-in of the desired modules, 84 HP effective width, used for A-100 basic system 1 and 2.
Upon request also available with mains inlet at the front side: because of the power input (additional panel 8 HP width) at the front then only 76 HP are available in the lower row. For this version the mains inlet is protected during transportation but the mains connection is at the front side! Upon request available in grey color also (additional charges).
Low sensitive audio processing modules (e.g. Spring Reverb) should be mounted near the power supply but mainly control voltage modules (e.g. ADSR, LFO, S&H, Slew Limiter, Trigger Delay, Sequencer, Quantizer, Clock Divider, MIDI-Interfaces).
The picture shows a Theremin/Sequencer application with two A-178 in the upper row and an A-155 in the lower row.
A-100LC6
A-100LC9 | Low cost open version of the Suitcases: similar to the portable suitcase described above but open version with 6 HU or 9 HU, no front cover, no handle, made of raw wood (no lacquer).
A-100 Portable Monster Cases: Large versions of the portable A-100 suitcase with double width (168 HP) and different heights (6, 9 and 12 U), available as single versions (A-100PMS6/9/12) or double version (A-100PMD12). The monster cases are equipped with these power supplies and bus boards:

<table>
<thead>
<tr>
<th>Case Version</th>
<th>Power Supplies</th>
<th>Bus boards</th>
<th>Total Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-100PMS6</td>
<td>2</td>
<td>4</td>
<td>2400</td>
</tr>
<tr>
<td>A-100PMS9</td>
<td>2</td>
<td>6</td>
<td>2400</td>
</tr>
<tr>
<td>A-100PMS12</td>
<td>4</td>
<td>8</td>
<td>4800</td>
</tr>
<tr>
<td>A-100PMD12</td>
<td>8</td>
<td>16</td>
<td>9600</td>
</tr>
</tbody>
</table>

For the double version the two suitcases are fixed together face-to-face during transportation so that no covers are required (as for the single version). More details (dimensions, weight, pictures) on our website.

A-100 Portable Monster Base: This is another frame for A-100 modules. It can be used as a stand alone unit or in combination with a monster case as it has the same width as the monster cases. It has a removable top cover with handle for easy transportation. The frame has two rows for modules available: one with horizontal alignment and another 45 degrees inclined row. The useable width is 168 HP, two power supplies (PSU2) and four bus boards are built in. A ribbon controller (A-198 or R2M) can be mounted in front of the frame and the A-100 CGK keyboard can be positioned below the ribbon controller. The right pictures show the A-100PMB with two A-100PMS9 mounted on top of each other. Special supports are available to fix the cases for safety reasons (even angled mounting possible).
<table>
<thead>
<tr>
<th>Product</th>
<th>Sketch</th>
<th>Description</th>
</tr>
</thead>
</table>
| A-100 MC     | ![Image](image1.png) | **A-100 Miniature Case**  
Built-in A-100 miniature power supply/bus board with higher output current (200 mA @ +/-12V and 50 mA @ +5V), width 32 HP (e.g. four modules with 8 HP), 4 bus connectors (i.e. max. 4 modules), alternatively raw wood (left picture) or black coated (right picture), outside measures: about 180 width x 155 height x 125 depth (mm), max. module depth in the left half: about 55 mm (because of the heat sinks of the power supply), max. module depth in the right half: about 85 mm, the handles on top of the cases are enclosed but not mounted, two holes with about 3 mm diameter have to be drilled to mount the handle, if the miniatures cases have to be stacked on top of each other the handles have to be omitted. |
| A-100 DIY1   | ![Image](image2.png) | **A-100 Do-It-Yourself kit 1**  
The A-100 DIY kit #1 is a combination of components that allows the inexpensive do-it-yourself construction of a case for the A-100. Because of safety reasons, no dangerous voltages are accessible because of the usage of an external transformer (AC output). The kit includes two bus boards, four 84 HP mounting rails with threaded inserts for module mounting (sufficient for 2x3U), all cables required for connections between power supply and bus boards. The max. output current is 1200mA. Sketches with measures (for drilling the holes at the right positions for PSU and bus board mounting) and building suggestions for wooden cases are included as well. Additional installation material like screws, nuts or distant bolts (e.g. for bus boards, power supply board, rails) is not included. Attention: from Doepfer (Germany) only 230V transformers with European mains plug type are available (external transformer with 15V/2.5A required), please ask the Doepfer representative in your country if they have a transformer available that is suitable for the mains voltage and mains plug in your country. |
| A-100 DIY2   | ![Image](image3.png) | **A-100 Do-It-Yourself kit 2**  
The A-100 DIY kit #2 is a combination of components that allows the very inexpensive do-it-yourself construction of a 3HE case for the A-100. Because of safety reasons, no dangerous voltages are accessible because of the usage of external wall outlet power supplies. The kit includes one bus board, two 84 HP mounting rails with threaded inserts for module mounting, an adapter boards and all cables required for connections between power supplies and bus board, and two stabilized 12V wall-outlet power supplies with 500 mA each (wide range switching power supplies with AC input range 100...240VAC, European type mains plugs). Building suggestion for wooden cases (sketch + list of all required wooden case parts) are included as well. Additional installation material like screws, nuts or distant bolts (e.g. for bus boards, power supply board, rails) is not included as these parts depend upon the type of case built by the customer. Attention: from Doepfer (Germany) only power supplies with European mains plug type are available (100...240V AC), please ask the Doepfer representative in your country if they have (stabilized!) supplies available that are equipped with mains plugs for your country. |

---

**A-100MC**  
**Width:** 32 HP  
**200 mA @ +/-12V**  
**50 mA @ +5V**  
(Source)  

**A-100 DIY1**  
**Current:** 1200 mA @ +/-12V  
(Source)  

**A-100 DIY2**  
**Current:** 500 mA @ +/-12V  
(Source)  

---

**Technical data are subject to change**  
**www.doepfer.com**
DOEPFER
A-100

Analog Modular System A-100

Product Sketch Description

**Module**

<table>
<thead>
<tr>
<th>Product</th>
<th>Sketch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-100 BUS</td>
<td>Bus board: one assembled and tested bus board, e.g. for customers who own a 19&quot; frame and need a bus board for A-100 modules, includes cables for connection to +/-12V power supply but no mechanical parts (e.g. screws, spacers, nuts, washers)</td>
<td></td>
</tr>
<tr>
<td>A-100 PSU2</td>
<td>Power supply II: +/-12V@ 1200mA, ring core transformer for low mechanical and electrical hum noise, please specify 230V or 115V version, does not include cables, mains inlet, power switch, fuse and mounting material</td>
<td></td>
</tr>
<tr>
<td>A-100 DIY PSU</td>
<td>Power supply for DIY applications: max. +/-12V@ 1200mA, external transformer (15V / 2.5A AC for max. current required), no dangerous voltages accessible! Available with or without transformer, does not include cables and mounting material, used in the A-100 DIY kit #1</td>
<td></td>
</tr>
<tr>
<td>A-100 AD5</td>
<td>5V Low-Cost Adapter: +5V@100 mA plug-in module; this module can be plugged into a free socket on the bus board; for modules which require +5V (e.g. A-113 or A-190), the current is taken from the 12V supply</td>
<td></td>
</tr>
<tr>
<td>A-100 MNT</td>
<td>Miniature Power supply and bus bord: +/-12V @ 200mA and +5V @ 50mA power supply with integrated bus board with 4 connectors, especially for applications with only one or a few modules (max. 100mA, max. 4 modules), requires an AC/AC adapter with 7...9V AC output (not DC), available with or without AC/AC adapter</td>
<td></td>
</tr>
<tr>
<td>A-100 B1 ... 42</td>
<td>Blank front panels: B1: 1 HP, B1.5: 1.5 HP, B2: 2 HP, B4: 4 HP, B8: 8 HP, B42: 42 HP</td>
<td></td>
</tr>
<tr>
<td>A-100 B84</td>
<td>Blank back panel 3U / 84 HP</td>
<td></td>
</tr>
<tr>
<td>A-100 B84P</td>
<td>Back panel with mains inlet for power supply mounting: 3U/84HP with mounting holes for 12V power supply, mains inlet with power switch, fuse holder and wires to connect the power supply, without power supply, please specify if 115V or 230V version is required (because of fuse and printing)</td>
<td></td>
</tr>
<tr>
<td>A-100 C...</td>
<td>Patch cords: available in different lengths, with 2 mono plugs 3.5 mm, C15: 15 cm (yellow), C30: 30 cm (black), C50: 50 cm (grey), C80: 80 cm (red), C120: 120 cm (blue), C200: 200 cm (green), even special cable 3.5 mm -&gt; 1/4&quot; available (1.5m, black)</td>
<td></td>
</tr>
<tr>
<td>A-100 OPM</td>
<td>Operating Manual: complete A-100 manual, containing all modules, ring folder with operating instructions for all existing modules (with application examples), is included without additional charge in the 3 basic systems, but has to be purchased separately if single modules or user arranged systems are ordered, available in German or English. Single manuals are only available for free download on our website but not as printed documents</td>
<td></td>
</tr>
<tr>
<td>A-100 SM</td>
<td>Service Manual: contains all schematics, part lists, adjustment rules and technical comments of the modules described in this prospectus (no future modules included), available only in German language (the service manual will not be translated to English), but most of the informations (schematics, parts list, components overlay and so on) are international. The service manual is purchased only to A-100 customers</td>
<td></td>
</tr>
</tbody>
</table>

**Modules in planning stage**

The following table shows some modules that are in the planning stage (as of spring 2009). The specifications are still without obligation and it is not guaranteed that the modules will be released at all!

<table>
<thead>
<tr>
<th>Module</th>
<th>Sketch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-143-4 Quad VCLFO/VCO</td>
<td>fourfold voltage controlled low frequency oscillator (LFO), frequency range up to moderate audio frequencies</td>
<td></td>
</tr>
<tr>
<td>A-111-2 Dynamic VCO</td>
<td>complex sound source based on a triangle core VCO and a lot of modulation features (linear FM, exponential FM, AM, two independent PM) and dynamic waveform morphing and waveform switching possibilities, more information including a detailed sketch and sound examples is available on our website</td>
<td></td>
</tr>
<tr>
<td>A-135-2 Quad VCF/VCA/Pan</td>
<td>audio mixing module with four identical units, each unit is made of a 24dB lowpass with Resonance, VCA and Panning, common left/right output, additional breakout module available with CV inputs for all four parameters of each unit, even a more modular version (with separate front panel for each sub-unit and additional filter types like high pass or band pass) is under discussion</td>
<td></td>
</tr>
<tr>
<td>A-192-2 CV/Gate-to-Midi Interface</td>
<td>converts CV and gate into the corresponding midi note messages, at the rising edge of the gate the CV voltage is measured and a corresponding note on message is generated, and at the falling edge note off. Additional voltages are converted into midi messages (e.g. CV2 = velocity, CV3 = loudness, CV4 = free controller)</td>
<td></td>
</tr>
<tr>
<td>A-195-1 Pitch-to-CV/Midi Interface</td>
<td>interface for conversion of a monophonic audio signal (e.g. singing, wind or string instrument) into the corresponding pitch CV (1V/Oct.), loudness CV and gate, simultaneous MIDI output</td>
<td></td>
</tr>
</tbody>
</table>
There are no fixed rules for which and how many modules are required in an analog modular system. If you are a beginner, you might have problems in finding the right combination of modules for a basic system. Thus, we have arranged two system packages to start with, containing the modules in the table on the right. The main difference between the basic systems 1 and 2 is the MIDI interface. System 1 is not equipped with a MIDI interface. If you want to control this system with MIDI you need an external MIDI-to-CV interface (e.g. MCV4). System 2 contains the MIDI interface A-190 instead of the two modules A-150 (Dual VCS) and A-162 (Dual Trigger Delay).

The modules are completely mounted into a 6U base frame and each system contains 30 cables (mixed lengths). The systems are available also as portable suitcase versions (with mains inlet on rear or front panel).

You will save some money compared to the regular prices when you purchase one of the basic systems! The purpose and function of the other modules not included with the basic systems will become clear while you are working with the A-100 system, and you will realize the missing modules for your application very soon. If you want to expand the basic systems you need an empty frame (e.g. A-100G6 or A-100P6/P9 or A-100LC6/9 or one of the monster cases or the monster basic frame) and the desired additional modules and patch cords.

The special prices are valid for these combinations only (no exchange of modules)!

On our web site we have some more suggestions for complete systems available, e.g.

- Expansion Systems for the Basic Systems
- Sound Processing Systems
- Trautonium System
- Theremin Systems
- Vocoder System
- Sequencer/Sampler System

and many more

For the planning of a system we have several tools available on our website:

- Excel planning sheet (with module widths and currents)
- different Java or Flash based module planners with pictures of the planned system

If you want to plan your specific system we ask you to pay attention to the remarks on the following pages.

The pictures on the right side show a A-100 basic system built into a rack mountable frame (A-100G6, upper picture) and the suitcase version (A-100P6)
A-100 Planning

In the following you find some information concerning the construction of the A-100. When you order one of the basic systems you will not have to deal with these details. But if you want to put together your own specific A-100 system this information will help you for your planning. For this mechanical and electrical aspects have to be taken into account. The mechanical aspects refer to the width of the modules, the electrical aspects to the power consumption of the modules. If you want to build your own system a bit technical experience is required. Otherwise we ask you to order the system ready assembled according to your given data.

On our web site we have some files available for download that make the A-100 planning a bit easier: a flash based module planner, an Excel™ file for automatic calculation of total current and total width of the desired modules, two picture files with all A-100 front panels (one as pixel pictures, the other as vector graphics in Corel Draw™ format)

Mechanical aspects

The construction of the A-100 modular system is based on the international standard 19" rack system (DIN 41494 / IEC 297-3 / IEEE 1001.1). First of all an empty frame with power supply and bus boards is required. This can be filled with the desired modules. The standard 6U frame (A-100G6) consists of two sections each 3U high, tied together by 6U side panels (see picture on the right side). It contains two bus boards, a power supply with +/-12V@1200mA (PSU2), the main electrical supply socket and all interconnections between these parts. Other versions of cases are available too (see separate page A-100 Housings).

Module front panels are all 3U high (1U = 1.75 inch = 1.75" = 44.45mm, 3U = 133.4 mm). The final height of the front panels is a bit less than 133.4 mm as the rim of the mounting rails has to taken into consideration. Consequently the final height is 128.5 mm for all A-100 front panels. Their width is measured in HP (HP = horizontal pitch, 1 HP = 5.08 mm or 1/5 inch or 1/5"). The actual width of a front panel is a few tenth of a mm less than the calculated value (i.e. multiple of 5.08 mm resp. multiple of 1/5") to have a little bit tolerance to assemble the panels. The table below shows the actual widths for the most common front panel measures and the position of the mounting holes relative to the front panel edges.

For the front panels up to 10 HP normally 2 mounting holes are sufficient (one below, one above). From 10 HP normally 4 or even more mounting holes are used. The horizontal distance of the mounting holes has to be a multiple of the HP grid, i.e. a multiple of 5.08 mm resp. 1/5" (= N x 5.08 in the sketch below). To assemble the modules in the frame M3x6 oval-head screws with cross recess (DIN7985) are used. The front panels are made of 2 mm anodized aluminium.

<table>
<thead>
<tr>
<th>width [HP]</th>
<th>calculated width [mm]</th>
<th>actual width [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.08</td>
<td>5.00</td>
</tr>
<tr>
<td>2</td>
<td>10.16</td>
<td>9.80</td>
</tr>
<tr>
<td>4</td>
<td>20.32</td>
<td>20.00</td>
</tr>
<tr>
<td>8</td>
<td>40.64</td>
<td>40.30</td>
</tr>
<tr>
<td>10</td>
<td>50.80</td>
<td>50.50</td>
</tr>
<tr>
<td>12</td>
<td>60.96</td>
<td>60.60</td>
</tr>
<tr>
<td>14</td>
<td>71.12</td>
<td>70.80</td>
</tr>
<tr>
<td>16</td>
<td>81.28</td>
<td>80.90</td>
</tr>
<tr>
<td>20</td>
<td>101.60</td>
<td>101.30</td>
</tr>
<tr>
<td>21</td>
<td>106.68</td>
<td>106.30</td>
</tr>
<tr>
<td>22</td>
<td>111.76</td>
<td>111.40</td>
</tr>
<tr>
<td>28</td>
<td>142.24</td>
<td>141.90</td>
</tr>
<tr>
<td>42</td>
<td>213.36</td>
<td>213.00</td>
</tr>
</tbody>
</table>

Module dimensions and positions of the mounting holes

Technical data are subject to change
The standard rack system has a usable width of 84 HP (= 426.4 mm). Individual modules can be fitted in any chosen layout into the 19" frame. If the modules don’t use up the entire 84 HP, then the spaces have to be covered with blanking panels due to safety and EMC reasons. We offer blind panels with 1, 2, 4, 8 and 42 HP. In the description for each module (e.g. A-110) the width of the module in HP measures can be found.

For the A-100G6 we use frames from the German company Gie-Tec (www.gie-tec.de). Frames from other manufacturer that meet the 19" standard can be used normally as well. If you want to build your own frames or if you need additional accessories you may order directly from Gie-Tec. We do not offer single mechanical parts but only completely assembled A-100 frames with built in power supply and bus boards.

Electrical aspects

The A-100 modules require the power supply voltages +12V and -12V, a few modules also need +5V (see module descriptions, e.g. A-113, A-190). The voltages are generated by the A-100 power supply and distributed to the bus boards. The new power supply II (A-100PSU2) has available 1200mA for both +12V/-12V and a ring core transformer for lower mechanical and electrical noise.

A-100PSUII

Each bus board is equipped with 14 double row pinheaders with 16 pins. The following signals are assigned to the bus board pin headers: -12V, GND, +12V, +5V, internal CV and internal Gate.

Each module is equipped with dual row pin header (10 or 16 pins). The connection between a module and the bus board is made with a 10 or 16 pin flat cable, having socket connectors pressed on each end. 10 pin cables only lead -12V, GND and +12V, the 16 pin cables also lead +5V, CV and Gate.

The signals +5V, CV and Gate are used by only some of the modules (see module description for details). CV and Gate are not required unconditionally since these signals may be supplied via front panel connectors too. These bus signals are supported only by VCOs, some envelope generators, bus access modules and Midi-CV/Gate interfaces.

For each module, the assembled flat cable required for connection to the bus is included; cables for front panel connections (patch cords) are not included and have to be ordered separately.

The required supply current is the sum of the currents of all modules in the frame (e.g. A-100G6). The current of each module is specified in the module description. Normally, the power supply A-100PSU2 is sufficient for a 6U or 9U system if not too many power consuming modules are used in the same system (e.g. too many A-110 or A-129-1/2).

A few of the modules (e.g. A-113, A-190-1) require an additional power supply of +5 V. For this the plug-in low cost adaptor A-100AD5 (max. current 100 mA) is available.

All cases available from us (A-100G6,A-100P6/9, A-100LC6/9 and the A-100 monster cases) are completely assembled and tested. They include the power supply (+/-12V, 1200 mA), bus boards, rear, top and bottom covers. At the rear panel the power supply, the mains inlet, power switch and fuse are located.

For applications with only one or a few modules the miniature power supply with integrated bus board (A-100MNT) is available. The A-100MNT delivers +/-12V (200mA) and +5V (50mA) and has 4 bus connectors. The A-100MNT runs with a standard AC adapter (9V AC output) and uses no dangerous voltages - in contrast to the A-100PSU2. The A-100MNT is also available with a small case (A-100 Miniature Case A-100MC).

For DIY applications we have a special DIY power supply with external transformer available, i.e. there are no dangerous voltages accessible.

The 6U basic frame is also available as a portable suitcase version (A-100P6). One can choose between mains inlet in front or at the rear panel. In the first case the lower row of the A-100P6 has only 76HP available as the mains inlet/switch/fuse requires 8HP on the front side. But the mains inlet is fully covered during transportation. If the version with the mains inlet at the rear panel is chosen the full 84 HP are available, but the mains inlet is not covered during transportation!

You can also purchase the bus board and power supply separately so that you may use other frames or power supplies. These devices are allowed to be installed only by qualified personnel because of the electrical safety (230 or 115V mains voltage).

Self-building of frames is recommended only for customers who are familiar with electronics because of the electrical safety!
MIDI Integration of the A-100

For integrating the A-100 into a MIDI system, the internal MIDI interfaces A-190-1, A-190-2 and A-192 or the external interfaces MCV4 and MSY2 are available.

The MIDI analog sequencer MAQ 16/3 is the right choice if you love analog sequences controlled by MIDI. It is equipped with 3 CV and Gate outputs which are compatible with the System A-100. Due to the MIDI features it has some different features compared to A-155.

Even some of our OEM products (e.g. MTV16, CTM64, MTC64, Pocket Electronic, Wheel Electronic, USB64, MKE, MBP25) can be used in combination with A-100 to transmit or receive Midi data. For example the MTC64 can be used to generate up to 64 gate signals controlled by Midi note messages and the MKE can be used as a keyboard to control the Midi interface A-190-1.

Prices

The prices for single modules do not include installation fee, user's manual and patch cords. The installation fee for one module is specified in the price list. We recommend to order only completely assembled and tested systems. Only experienced users may order single modules with separate frames and assemble the modules in the frames themselves.

The module prices are valid for orders of single modules. If you order modules together with a basic frame, the modules will normally be installed into the frame, paying regard to your wishes for configuration. In this case the mounting fee per module has to be added. Only if you wish the modules expressly unassembled we ship the modules and the frame separately.

Single modules do not include the user’s guide, only the basic systems include the user’s guide! If you order single modules the user’s guide has to be ordered additionally. The user’s guide is available in printed form only for the complete A-100 system (including all modules), not for single modules. For single modules you find the user’s guides as pdf-files on our web site www.doepfer.com for print-out.

Handling and shipping charges, import duty and tax are not included in the prices. These depend upon the country, distance, weight and type of shipment. If there is a Doepfer representative in your home country you have to order from the representative (please look at our web site www.doepfer.com -> DEALERS for details).