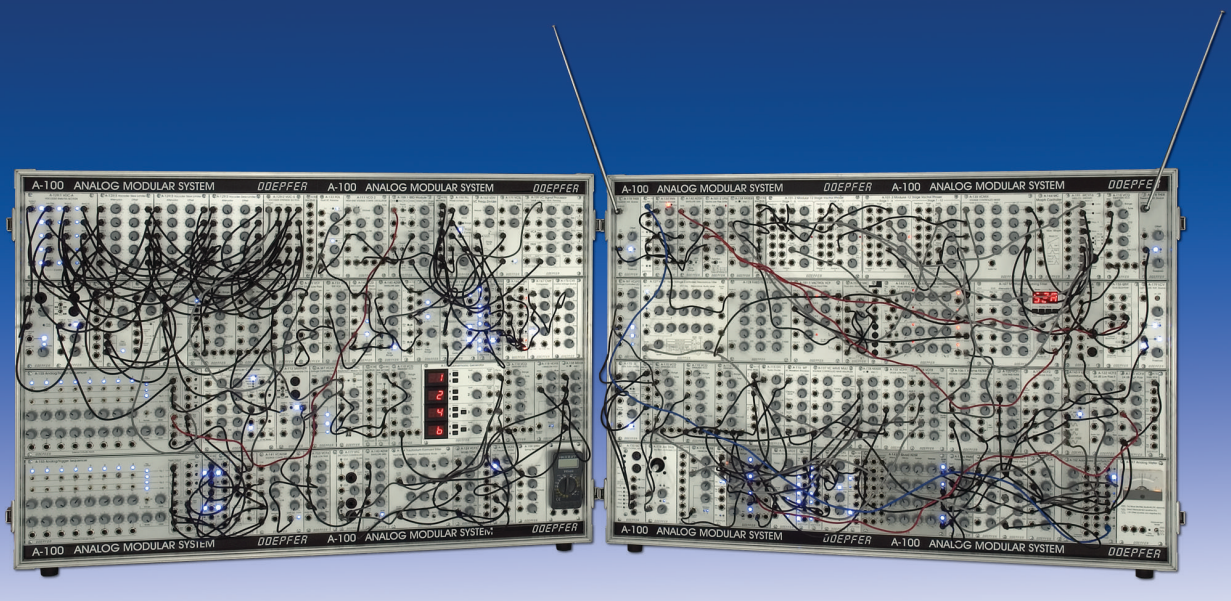
A-100

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 of the last century.

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 control voltages and audio signals. 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.

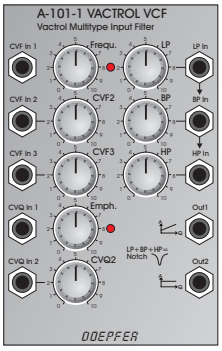
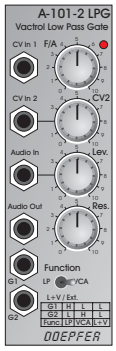
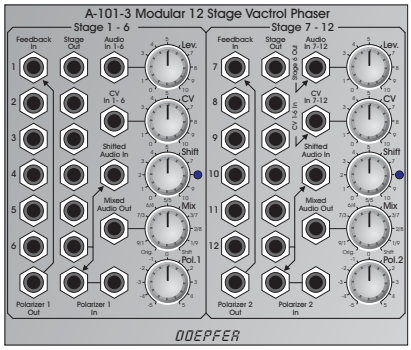
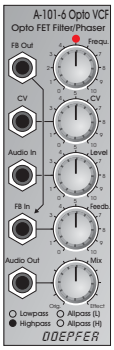
At this point we also hope for your understanding that the low prices of the A-100 modules cannot include a detailed personal guidance in analog sound synthesis with modular systems or in how to connect and adjust modules for obtaining a specific sound. But we offer workshops now and then and a lot of useful information is available in the internet (e.g. A-100 demo videos from other customes in Youtube).

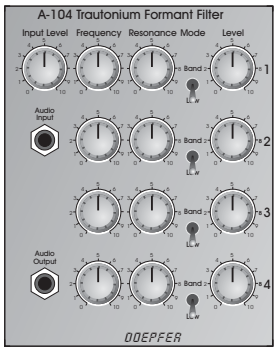
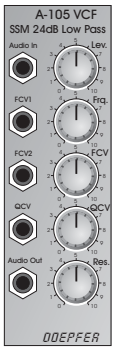
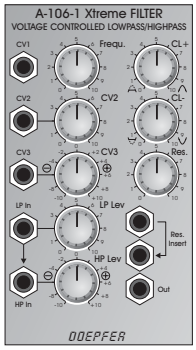
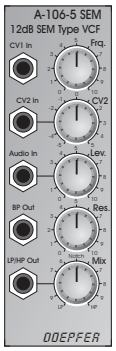
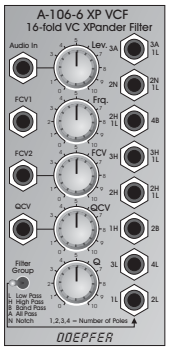
The following pages show detailed information about the A-100 modules available at present (as of January 2015). If you need additional information please visit our internet web site www.doepfer.com. Here you will find a more detailed description of each module, user’s manuals and sound examples.

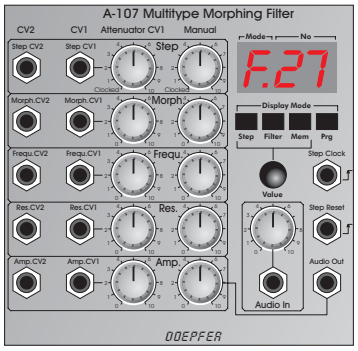
Also if you want to stay informed regarding new A-100 modules, we recommend to visit our web site now and then as you will find here current information about new A-100 modules and other products.

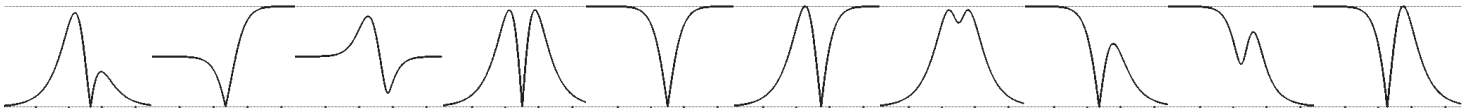
The A-100 manual is available for free download on our website (complete manual or single modules only).

The A-100 basic systems and frames are available for 230V or 115V mains voltage. Please specify the version you need when you order.

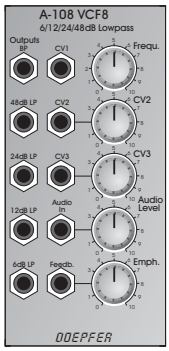
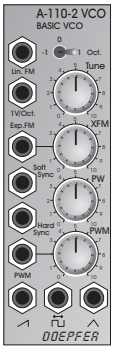
Module	Sketch	Description	Controls	In/Outputs
A-101-1 **Width:** **16 HP** **Current:** **30 mA** *(the 101-X numbers are used for **vactrol** modules.* *Details about vactrols can be found on our web site)*		**VACTROL Steiner VCF** A special multitype filter based on an idea by Nyle A. Steiner from 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	• Frequency • Frequ. LED • CVF2 • CVF3 • Resonance • Res. LED • CVQ2 • LP Level • BP Level • HP Level • Res/Level	• CVF1 • CVF2 • CVF3 • CVQ1 • CVQ2 • LP In • BP In • HP In • Out 1 • Out 2
A-101-2 **Width:** **8 HP** **Current:** **20 mA** *(the 101-X numbers are used for **vactrol** modules.* *Details about vactrols can be found on our web site)*		**VACTROL Lowpass Gate** 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)	• F/A • F/A LED • CV2 • Level • Resonance • Function LP/VCA/Both	• CV In 1 • CV In 2 • Audio In • Audio Out • Function Gate 1 • Function Gate 2
A-101-3 **Width:** **30 HP** **Current:** **50 mA** *(the 101-X numbers are used for **vactrol** modules.* *Details about vactrols can be found on our web site)*	 *Detailed information including sound examples is available on our web site www.doepfer.com*	**Modular Vactrol Phaser** 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)	• Level 1 + 2 • CV 1 + 2 • Shift 1 + 2 • Shift LED 1 + 2 • Mix 1 + 2 • Polarizer 1 + 2	• Audio In 1-6 / 7-12 • CV In 1-6 / 7-12 • Shifted Audio In 1 / 2 • Mixed Audio Out 1 / 2 • Polarizer In 1/2 • Polarizer Out 1/2 • Stage Out 1-12 • Feedback In 1-12
A-101-6 **Width:** **8 HP** **Current:** **~ 50mA**		**Opto FET VCF** filter module that uses opto FETs to control the filter frequency (opto FETs are very similar to Vactrols but use light depending field effect transistors (FETs) instead of light depending resistors (LDRs), six serial 6dB filter stages, each stage can work as lowpass, highpass or one of two allpass types, the type of filter is chosen by jumpers on the pc board, resonance is controlled by the Feedback control up to self oscillation, the Mix control is used to pan between the original signal and the effect signal	• Frequency • CV • Audio Level • Feedback • Mix • Frequency (LED)	• Audio In • CV In • Audio Out • Feedback Out • Feedback In
A-102 **A-103** **Width:** **8 HP** **Current:** **30 mA**	 	**A-102: Diode Lowpass** description see A-120 **A-103: 18 dB Lowpass** description see A-120		

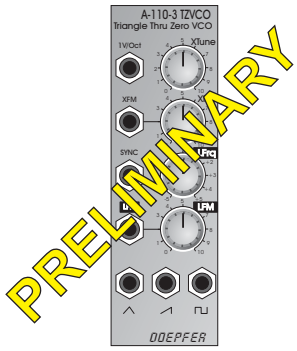
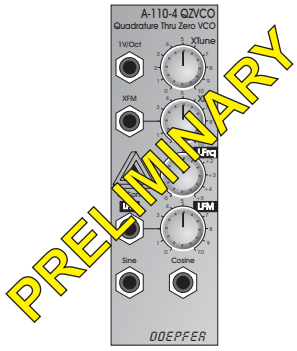
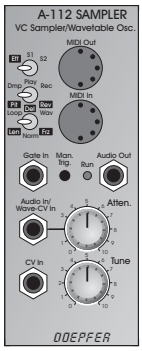
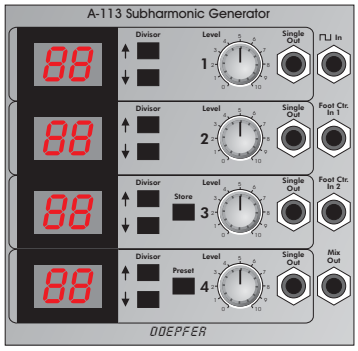
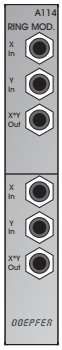
Module	Sketch	Description	Controls	In/Outputs
A-104 **Width:** **20 HP** **Current:** **30 mA** **(as all 12X numbers are used up the 10X numbers are used for new filters)**		**Trautonium Formant Filter** four independent manually controlled band pass/low pass filters as used in the ***Mixtur Trautonium*** (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) A similar filter module with voltage control of the filter frequencies is the A-127.	• Input Level for each filter: • Frequency • Resonance • Mode (switch) • Level	• Audio In • Audio Out
A-105 **Width:** **8 TE** **Current:** **30 mA** *(as all 12X numbers are used up the 10X numbers are used for new filters)*		**24 dB SSM Low Pass** 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)	• Audio Level • Frequency • FCV2 • Resonance • QCV	• Audio In • FCV1 • FCV2 • QCV • Audio Out
A-106-1 **Width:** **14 TE** **Current:** **30 mA** *(as all 12X numbers are used up the 10X numbers are used for new filters)*		**X-treme Filter** 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. vactrol connection). Two different CV inputs: one with attenuator, one with polarizer. The low pass audio input is normalled 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.	• Frequency • CV2 • CV3 • Audio Level LP • Audio Level HP • Clipping+ • Clipping- • Resonance *More detailed information about the module including sound examples is available on our web site*	• CV1 • CV2 • CV3 • Audio In LP • Audio In HP • Resonance send • Resonance receive • Audio Out
A-106-5 **Width:** **8 HP** **Current:** **30 mA**		**SEM VCF** 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 !	• Audio Level • Frequency • CV2 • Resonance • Mix (relation between low and high pass)	• Audio In • CV 1 • CV 2 • Band Pass Out • Mix Out
A-106-6 **Width:** **12 HP** **Current:** **~ 40 mA**		**XP VCF / Filter Pool** 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	• Audio Level • Frequency • CV F2 • Resonance (Q) • CV Q • Filter Group (toggle switch)	• Audio In • CVF 1 • CVF 2 • CVQ • Filter Outputs: ° 3A/3A1L ° 2N/2N1L ° 2H1L/4B ° 3H/3H1L ° 2H/2H1L ° 1H/2B ° 3L/4L ° 1L/2L

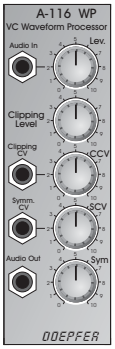
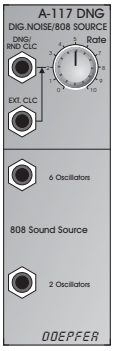
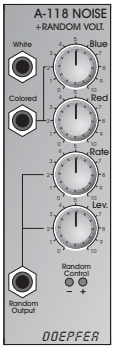
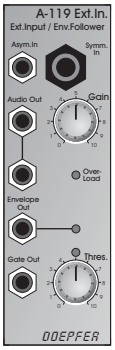
Module	Sketch	Description	Controls	In/Outputs
A-107 **Width:** **26 HP** **Current:** **200 mA** *(as all 12X numbers are used up the 10X numbers are used for new filters)*		**A-107: VC Multitype Morphing filter** completely new filter design that makes available 36 different filter types, e.g. 6/12/18/24dB 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. The morphing time (i.e. the time required to go from one filter to the next filter of the chain) is manually and voltage controlled too. Consequently it is possible to "switch" (morphing time = 0) or to "morph" between filters in a chain (max. about 10 seconds). There is one limitation: the 36 filter are arranged at two groups with 18 filters each. 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	• Manual Step • Step CV • Manual Morph. • Morph. CV • Manual Frequency • Frequency CV • Man. Res. • Resonance • Man. Ampl. • Amplitude CV • Prg Buttons • Value encoder • 3 digit display *More detailed information about the module including sound examples is available on our web site*	• Step CV • Morph. CV • Frequ. CV • Resonance CV • Amplitude CV • Audio In • Audio Out • Step Clock

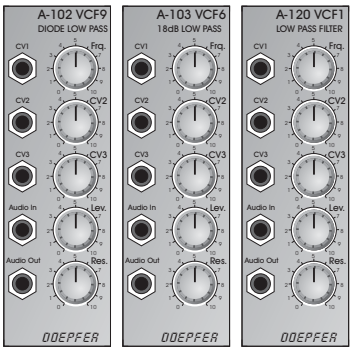
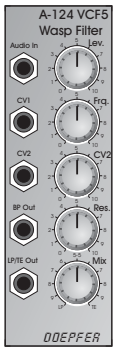
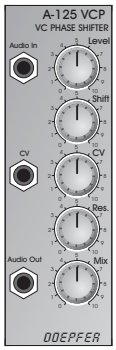


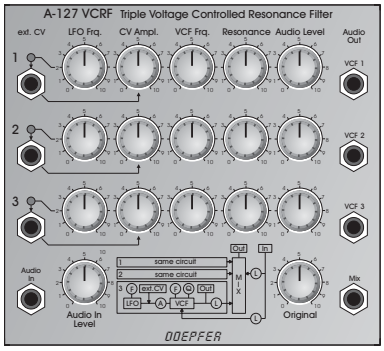
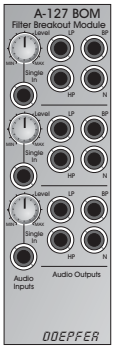
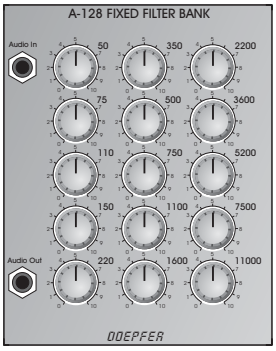
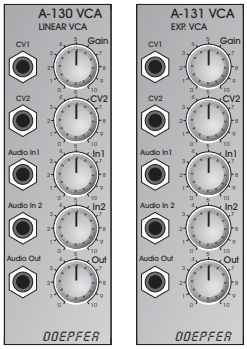
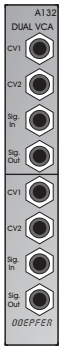
Examples for the frequency response of some unusual filter types of the A-107 (standard filters like low/high/bandpass are not shown)

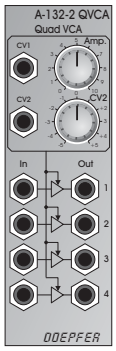
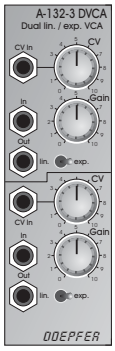
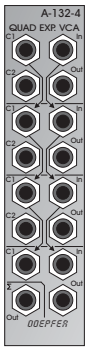
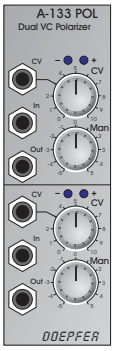
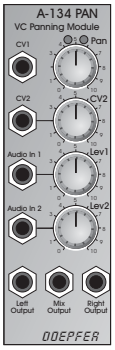
A-108 **Width:** **12 HP** **Current:** **40 mA** **(as all 12X numbers are used up the 10X numbers are used for new filters)**		**6/12/24/48 dB Low / Band Pass** complete new filter design based on Moog's transistor ladder but with 8 filter stages, internal 6...48dB slope low pass and band pass available, 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-110-1 **Width:** **10 HP** **Current:** **70 mA**		**Standard VCO** 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 pulsewidth (one with attenuator) *Difference to High-End VCO:* frequency range, waveforms not 100% ideal (musically not a disadvantage in every case), no linear FM input, no soft sync input	• Range (5-step rotary switch) • Tune • CV 2 • Pulse Width • PW CV2	• CV 1 • CV 2 • PW CV1 • PW CV2 • SYNC • Rectangle • Saw • Triangle
A-110-2 **Width:** **8 HP** **Current:** **80 mA**		**Basic VCO** same features as A110, with these differences: • no sine output • three-position octave switch instead of rotary switch • additional linear FM input • additional Soft Sync input • only 8HP width instead of 10HP	• Range (3-position switch) • Tune • XFM • Pulse Width • Pulse Width Modulation	• LFM • 1V/Oct. • XFM • Soft Syn • Hard Sync • PWM • Saw • Rectangle • Triangle

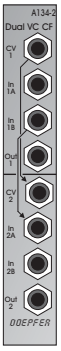
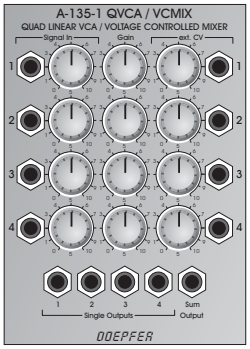
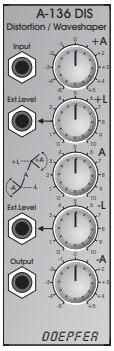
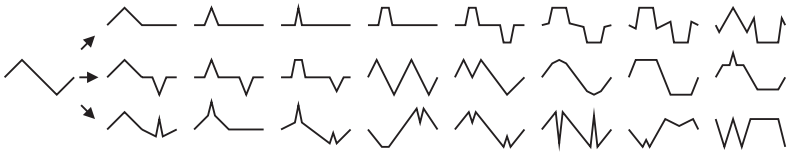
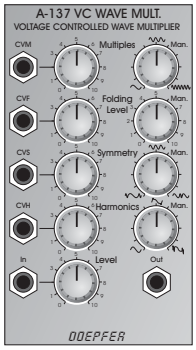
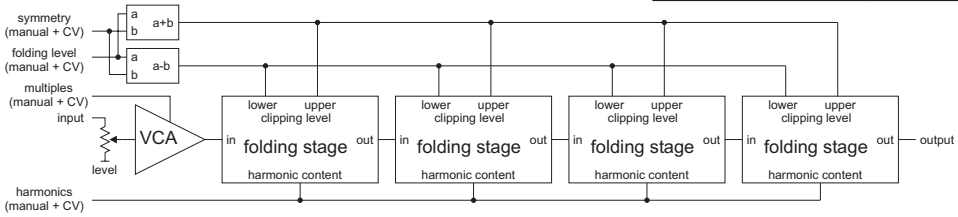
Module	Sketch	Description	Controls	In/Outputs
A-110-3 **Width:** **8 HP** **Current:** **? mA**		**Thru Zero VCO (Triangle Core)** • Thru Zero VCO with Triangle core • waveshapers for sawtooth and rectangle • Triangle, Sawtooth and Rectangle outputs • Exponential Control section with manual frequency control (XTune), fixed CV input (~1V/Oct) and CV input with attenuator /XFM) • Linear Control section with manual frequency control (LFrq), and CV input with attenuator (LFM) • Dual LED for positive/negative frequency display	• XTune • XFM • LFrq • LFM • pos/neg. Frequency (LED)	• 1V/Oct. • XFM • LFM • Triangle • Sawtooth • Rectangle
A-110-4 **Width:** **8 HP** **Current:** **? mA**		**Quadrature Thru Zero VCO** • Thru Zero VCO with Sine/Cosine core • Sine and Cosine output • Exponential Control section with manual frequency control (XTune), fixed CV input (~1V/Oct) and CV input with attenuator /XFM) • Linear Control section with manual frequency control (LFrq), and CV input with attenuator (LFM) • Dual LED for positive/negative frequency display	• XTune • XFM • LFrq • LFM • pos/neg. Frequency (LED)	• 1V/Oct. • XFM • LFM • Sine • Cosine
A-112 **Width:** **10 HP** **Current:** **50 mA**		**8 Bit Sampler/Wavetable Oscillator** 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 modes: • Sampler with pitch CV, record/play/dump • Wavetable oscillator with pitch CV and second CV for passing through the 256 wavetables (each table has 256 byte) • Effects (normal/reverse delay, harmonizer, pitch shift)	• Tune • Attenuator Audio/CV2 • manual Trig. • Gate (LED) • 3 switches for mode control *More detailed information about the module including sound examples is available on our web site*	• CV1 (tune) • Audio In / CV2 (Wavetable) • Audio Out • Gate In • MIDI In • MIDI Out
A-113 **Width:** **26 HP** **Current:** **30 mA** **and** **100 mA @+5V** **(5V supply required !)**		**Subharmonic Generator** 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 "mixtures", 50 user defined presets with 4 different mixtures, detailed information regarding A-113/ Trautonium is available on our web site www.doepfer.com	• 4 x 2-digit LED display • 4 x Up/Down (8 buttons) • Preset (button) • Store (button) • 4 x Level	• Master Frequ. In (Rectangle) • 4 x Single Out • Mix Out • Gate 1 In • Gate 2 In
A-114 **Width:** **4 HP** **Current:** **40 mA**		**Dual Ring Modulator** 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)		• per ring modulator: • • X In • Y In • X • Y Out

Module	Sketch	Description	Controls	In/Outputs
A-115 **Width:** **8 HP** **Current:** **20 mA**		**AUDIO DIVIDER** 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 **Width:** **8 HP** **Current:** **20 mA**		**WP - VC Waveform Processor** 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 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 **Width:** **8 HP** **Current:** **20 mA**		**DNG / 808 - Digital Noise / Random Clock / 808-Source** 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 **Width:** **8 HP** **Current:** **20 mA**		**Noise / Random** standard analog noise generator (noise derived from transistor) with white and colored noise outputs 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 **Width:** **8 HP** **Current:** **30 mA**		**External Input / Envelope Follower** input module for including external audio signals into A-100 sound processing symmetrical input (stereo jack ¼ “) with input level control 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

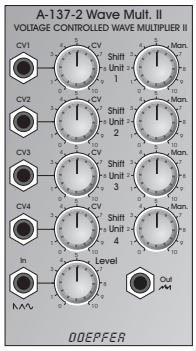
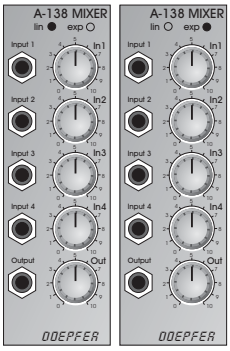
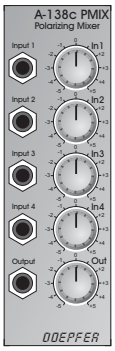
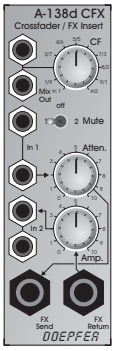
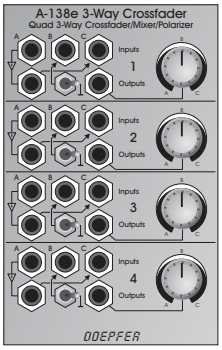
Module	Sketch	Description	Controls	In/Outputs
A-102 **A-103** **A-120** **Width:** **8 HP** **Current:** **30 mA**		All 3 filters are based on the so-called ladder principle (invented by Bob Moog) but with different types of electronic parts that are responsible for the special sound of each filter **A-120: 24 dB Low Pass 1** original Moog transistor ladder with 24 dB/oct slope **A-103: 18 dB Low Pass 1** modified Moog transistor ladder as used e.g. in TB-303 **A-102: Diode Low Pass 1 (VCF 9)** ladder with diodes instead of transistors as used e.g. in EMS filters For all modules: 3 CV inputs for filter frequency, 2 with attenuators, audio input with attenuator, resonance up to self oscillation	for all modules: • Audio Level • Frequency • Resonance • CV 2 (attenuator) • CV 3 (attenuator)	for all modules: • Audio In • CV 1 • CV 2 • CV 3 • Audio Out
A-122 **Width:** **8 HP** **Current:** **20 mA**		**24 dB Low Pass 2** 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.	• Audio Level • Frequency • FCV2 • Resonance • QCV	• Audio In • FCV1 • FCV2 • QCV • Audio Out
A-124 **Width:** **8 HP** **Current:** **40 mA**		**Wasp Filter (VCF 5)** 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 ouput, 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)	• Audio Level • Frequency • CV2 • Resonance • Mix (relation between low and high pass)	• Audio In • CV 1 • CV 2 • Band Pass Out • Mix Out
A-125 **Width:** **8 HP** **Current:** **20 mA**		**Voltage Controlled Phaser VCP** 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 baberpole phasing effects can be realized (up or down going never ending phasing) For a Vactrol based Phaser see A-101-3	• Audio Level • Phase • CV2 • Resonance • Signal Ratio	• Audio In • CV 1 • CV 2 • Audio Out

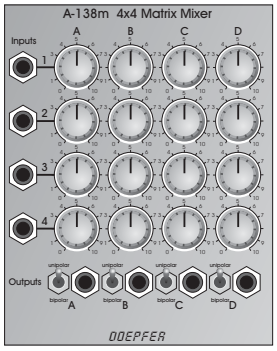
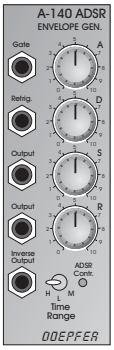
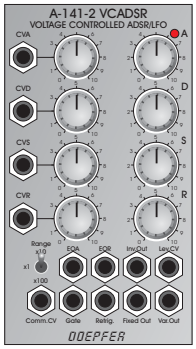
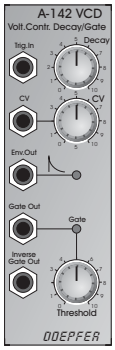
Module	Sketch	Description	Controls	In/Outputs
A-127 **Width:** **28 HP** **Current:** **100 mA**		**Voltage Controlled Resonance Filter** 3 x bandpass with VC frequency (40...10kHz) controls for resonance and audio level, LFO for each filter with controls for frequency (0,05...20Hz) and level, ext. CV 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)	per band pass: • LFO Frequ. • LFO/VC Ampl. • VCF Frequ. • Resonance • Level • (jumper for optional low pass instead of band pass) common: • Audio In Level	per band pass: • ext. CV In • Audio Out (Single) common: • Audio In • Audio Out (Mix)
A-127BOM **Width:** **6 HP** **Current:** **20 mA**		**Breakout Module for A-127** • enables separate access to each of the three filters of the A-127 main module • additional notch filter for each sub-unit • separate outputs for lowpass, highpass, bandpass and notch for each sub-unit • separate audio input with attenuator for each sub-unit • main module A-127 required	per unit: • Audio Level (single input)	per unit: • single Audio In • Lowpass • Highpass • Bandpass • Notch
A-128 **Width:** **20 HP** **Current:** **20 mA**		**Fixed Filter Bank** 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	per band pass: • Amplitude (15x)	• Audio In • Audio Out
A-130 **A-131** **Width:** **8 HP** **Current:** **20 mA**		**VCA - Voltage Controlled Amplifier** 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) A-130 : linear characteristic A-131 : logarithmic characteristic 2 audio inputs with attentuators; 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)	• Audio In 1 • Audio In 2 • Gain • CV 2	• Audio In 1 • Audio In 2 • CV 1 • CV 2 • Audio Out
A-132-1 **Width:** **4 HP** **Current:** **20 mA**		**Dual Low Cost VCA** 2 simple linear low cost VCAs, 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.		each VCA: • CV 1 • CV 2 • Signal In • Signal Out

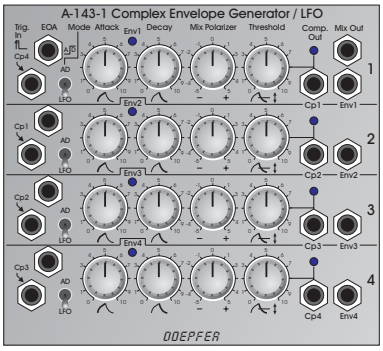
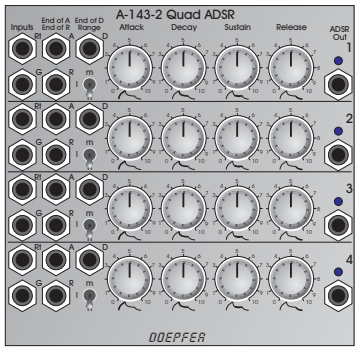
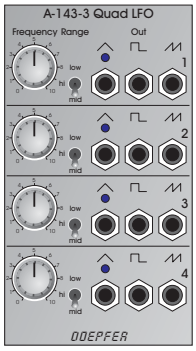
Module	Sketch	Description	Controls	In/Outputs
A-132-2 **Width:** **8 HP** **Current:** **20 mA**		**Quad VCA** fourfold VCA with common level control section for all VCAs, manual level control *Amp*. and two control voltage inputs *CV1* and *CV2* are available, CV2 is equipped with a polarizer to adjust 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-143-9 is equipped with a suitable internal matching connector)	• Amp. • CV2 (Polarizer)	• CV1 In • CV2 In • Signal In 1 • Signal In 2 • Signal In 3 • Signal In 4 • Signal Out 1 • Signal Out 2 • Signal Out 2 • Signal Out 4
A-132-3 **Width:** **8 HP** **Current:** **30 mA**		**Dual linear/exponential VCA** 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. *The module will be manufactured as long as the special integrated circuit (CEM3360) is available.*	each VCA: • CV • Gain • lin./exp. (toggle switch)	each VCA: • CV In • Signal In • Signal Out
A-132-4 **Width:** **6 HP** **Current:** **20 mA**		**Quad Voltage Controlled Amplifier** four identical VCAs with exponential control scales (~ 12dB/V with -60dB@0V and 0dB@+5V), each VCA has two CV inputs (C1, C2), a signal input and a signal output. All C1 inputs and the signal inputs are normalled, in addition the sum of all four outputs is available, the full amplification range is about -90dB ... + 20dB (for attenuations below -60dB a negative and for amplifications beyond 0dB a positive CV more than +5V is required), for all C1 inputs trimming potentiometers are available to adjust the control scale for other voltage ranges (e.g. 0...+8V for A-140 control)		each VCA: • CV1 In • CV2 In (only 1-3) • Signal In • Signal Out • Sum Out (instead of CV2 unit4)
A-133 **Width:** **8 HP** **Current:** **30 mA**		**Dual Voltage Controlled Polarizer** 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 diplay, similar to A-134); another module with polarizing function is 138c.	each Polarizer: • CV • Man • + LED • - LED	each Polarizer: • CV In • Signal In • Signal Out
A-134-1 **Width:** **8 HP** **Current:** **40 mA**		**PAN - Voltage Controlled Panning** manual or voltage controlled panning via two CV control inputs (one with attenuator), 2 LEDs for panning display, two panning types available: • input panning: panning between 2 input signals, the output appears at the mix output • output panning: distributing one input signal to two outputs (left and right output)	• Panning • 2 LEDs (pan control) • Attenuator CV2 • Level 1 • Level 2	• CV In 1 • CV In 2 • Audio In 1 • Audio In 2 • Left Out • Mix Out • Right Out

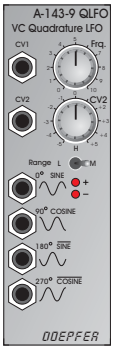
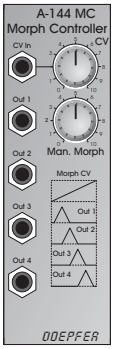
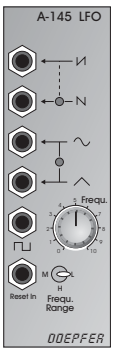
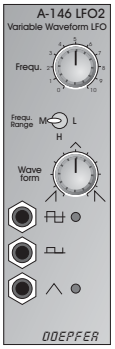
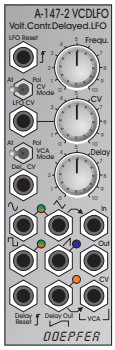
Module	Sketch	Description	Controls	In/Outputs
A-134-2 **Width:** **4 HP** **Current:** **20 mA**		**Dual Voltage Controlled Crossfader** two identical voltage controlled crossfader units, in/outputs are DC coupled, i.e. the module can be used for both audio and control voltage signal processing, each unit has two VCAs with opposite control behaviour available 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) 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)		each sub-unit: • CV In • Signal In A • Signal In B • Out
A-135-1 **Width:** **18 HP** **Current:** **60 mA**		**Voltage Controlled Mixer** quad voltage controlled mixer made of 4 independent linear VCA's with four single outputs and one common output. For each VCA the following inputs and controls are available: audio and control voltage input both with attenuator, gain (pre-amplification). 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.	For each VCA: • Audio In • Gain • CV In	For each VCA • Audio In • CV In • Single Out common: • Audio Out
A-136 **Width:** **8 HP** **Current:** **30 mA**		**Distortion / Waveshaper** Distortion and waveshaping module with extensive control possibilities. The incoming signal is internally divided into 3 components: •positive component with adjustable clipping level •negative component with adjustable clipping lev. •original signal 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 **Waveform examples for the A-136 function whith triangle as input signal** 	• +A (pos. amp.) • +L (pos. clip.) • A (orig. amp.) • -L (neg. clip.) • -A (neg. amp.)	• Input • ext. Clipping Level pos. • ext. Clipping Level neg. • Output
A-137-1 **Width:** **14 HP** **Current:** **40 mA**		**Voltage Controlled Wave Multiplier I** 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) *Level/Symmetry:* value/symmety of upper/lower folding level 	• Multiples (Man + CV) • Folding Level (Man + CV) • Symmetry (Man + CV) • Harmonics (Man + CV) • Input Level	• CV Multiples • CV Folding Level • CV Symmetry • CV Harmonics • Audio In • Audio Out

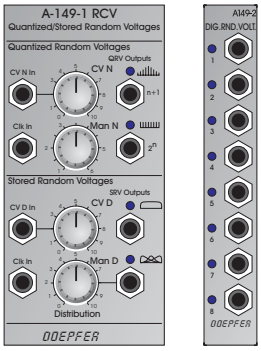
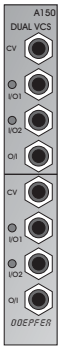
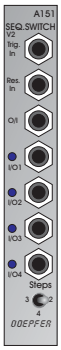
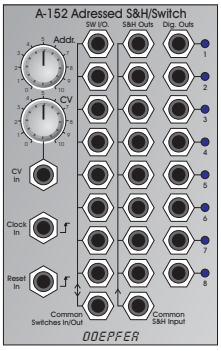
Detailed information with graphical explanation and sound examplesis available on our web site www.doepfer.com

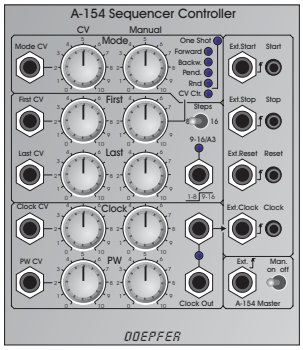
Module	Sketch	Description	Controls	In/Outputs
A-137-2 **Width:** **14 HP** **Current:** **30 mA**		**Voltage Controlled Wave Multiplier II** Module A-137-2 is another version of a wave multiplier. In contrast to the A-137-1 Wavemultiplier I the A-137-2 generates four phase-shifted copies of a VCO signal (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 a 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.	• Audio Level • Manual Shift 1 • Manual Shift 2 • Manual Shift 3 • Manual Shift 4 • CV Input 1 • CV Input 2 • CV Input 3 • CV Input 4	• Audio In • CV Input 1 • CV Input 2 • CV Input 3 • CV Input 4 • Audio Out
A-138 a/b **Width:** **8 HP** **Current:** **10 mA**		**Mixer** 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 an 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	• Level 1 • Level 2 • Level 3 • Level 4 • Output Level	• Input 1 • Input 2 • Input 3 • Input 4 • Output
A-138c **Width:** **8 HP** **Current:** **20 mA**		**Polarizing Mixer** 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	• Polarizer 1 • Polarizer 2 • Polarizer 3 • Polarizer 4 • Output Polarizer	• Input 1 • Input 2 • Input 3 • Input 4 • Output
A-138d **Width:** **8 HP** **Current:** **30 mA**		**Crossfader / FX Insert** dual function module: Crossfader: two audio signals are connected to *In 1* and *In 2,* the position of the *CF* (**C**ross**f**ade) control defines the level relation between *In 1* and *In 2* that appear at the *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 *Amp.* is used to amplify the signal to obtain again A-100 audio level. The output of the amplifier is normalled 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 In1 / original or In2 / effect signal independent of the position of the crossfade control.	• CF (crossfade or dry/wet) • Mute (toggle switch) • Atten. • Ampl.	• In 1 (2x) • In 2 (2x) • Mix Out (2x) • FX Send (1/4") • FX Return (1/4")
A-138e **Width:** **16 HP** ***Current:*** ***10 mA***		**Quad Three-Way Crossfader/Mixer/Polarizer** 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. Two-way Crossfader: two signals connected to A and C, result: crossfader between A and C, center: both signals same level. Two-way attenuator: 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	For each unit: • Crossfade control (with center detent) • Toggle switch (input B =GND)	For each unit: • Input A • Input B • Input C • Output inverted A • Crossfade Output

Module	Sketch	Description	Controls	In/Outputs
A-138m **Width:** **20 HP** ***Current:*** ***30 mA***		**4 x 4 Matrix Mixer** 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.	Control for each crosspoint: •Level/Polarizer (16x) Switch for each column: •unipolar/bipolar (4x)	• Input 1 • Input 2 • Input 3 • Input 4 • Output A • Output B • Output C • Output D
A-138u **Width:** **4 HP** ***Current:*** ***20 mA***		**Micro Mixer** • simple, low-cost mixer with two units • each unit is equipped with three inputs and one output • the upper unit has for each input a trimming potentiometer available that allows to adjust the amplification in the range 0...+1 for each input (factory setting is 1 for all inputs) • the inputs of the lower unit all have the same amplification +1 • the output of the upper unit is normalled to the first input of the lower unit. That way the module can be used also as a mixer with five inputs • Inputs and Outputs are DC-coupled, i.e. audio and control signals can be mixed.	Internal controls for unit #1 (trimming potentiometers): •Level (3x)	For each unit: •Input 1 •Input 2 •Input 3 •Output
A-140 **Width:** **8 HP** **Current:** **20 mA**		**ADSR - Envelope Generator** 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 normalled to the bus	• Attack • Decay • Sustain • Release • Range (3-step switch) • Control LED	• Gate • Retrigger • Normal Out 1 • Normal Out 2 • Inverse Out
A-141-2 **Width:** **14 HP** **Current:** **40 mA**		**VC ADSR - Voltage Controlled Envelope Generator** voltage-controlled envelope generator with manual controls and CV inputs with attenuator for each parameter: Attack / Decay / Sustain / Release Common CV input for all time parametes (A,D,R) 3 envelope outputs: fixed, inverted and variable output (VCA with additional Level CV input) 2 digital outputs: End of Attack, End of Release 2 digital inputs: Gate, Retrigger envelope time from ~ 50 Microseconds up to 10 minutes range switch: x1/x10/x100 envelope display with LED	• Attack • Decay • Sustain • Release • Attack CV • Decay CV • Sustain CV • Release CV • Range Switch • Control LED	• Attack CV • Decay CV • Sustain CV • Release CV • Common CV • Gate • Retrigger • Fixed Out • Inverted Out • Variable Out • Level CV In • End of Attack • End of Release
A-142-1 **Width:** **8 HP** **Current:** **40 mA**		**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 obtaines additionally a gate signal with voltage controlled duration, with two A-142 a voltage controlled trigger delay can be realized	• Decay • CV • Threshold • Envelope LED • Gate LED	• Trigger In • CV • Envelope Out • Gate Out • Inverse Gate Out

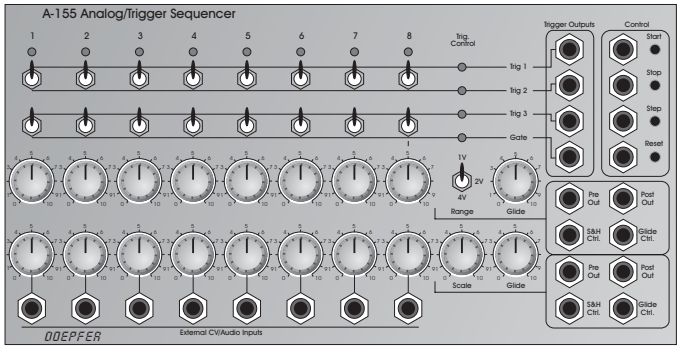
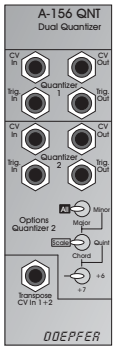
Module	Sketch	Description	Controls	In/Outputs
A-142-4 **Width:** **8 HP** **Current:** **30 mA**		**Quad Decay** four simple envelope generators with only one manually controlled parameter: decay, envelope duration ranges from about 2 ms up to 2 s internal trimming potentiometer for attack time (about 1...15 ms) LED display for each unit, the trigger inputs are normalled 1 > 2 > 3 > 4 Internal jumpers for loop mode (LFO with exponential slope) application examples: controlling the four CV inputs of the quad VCA A-132-4	For each unit: • Decay • Envelope LED	For each unit: • Trigger In • Envelope Out
A-143-1 **Width:** **28 HP** **Current:** **70 mA**		**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	Each Sub-Unit: • Mode switch (AD/LFO) • Attack • Decay • Mix (Polarizer) • Comparator Threshold • Envelope/LFO (LED) • Comparator Out (LED)	Each Sub-Unit: • Trig In • EOA Out • Comparator Out • Envelope/LFO Out Module: • Mix Out
A-143-2 **Width:** **26 HP** **Current:** **70 mA**		**A-143-2 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 ➜ Gate 2 ➜ Gate 3 ➜ Gate 4	• Range l/m/h • Attack • Decay • Sustain • Release • Envelope Control (LED)	• Gate In • Retrigger In • EOA Out • EOD Out • EOR Out • Envelope Out (ADSR Out)
A-143-3 **Width:** **14 HP** **Current:** **70 mA**		**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-143-4 **Width:** **22 HP** **Current:** **100 mA**		**Quad VCLFO/VCO** four independent voltage controlled LFOs/VCOs with triangle core, range switch LFO/VCO, frequency ~ 0.001Hz (LFO) up to ~ 15kHz (VCO), each unit is equipped with manual frequency control, range switch, one CV input with and one without attenuator (~ 1V/oct for ~5 octave range), reset/direction input, triangle and rectangle output, LED display, unit #4 has separate inputs for reset and direction, and an additional switch for direction up/both/down, more details about these features are available on our website common section with same controls and inputs as each unit, sum outputs triangles/rectangles with displays	For each unit • CV2 (atten.) • Frequency • Range switch • LED display Common section • CV2 (atten.) • Frequency • LED triangle sum • LED rectangle sum	For each unit • CV1 in • CV2 in • tringle out • rectangle out • reset/dir. in Common section • CV1 in • CV2 in • triangle sum out • rectangle sum out

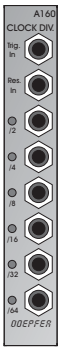
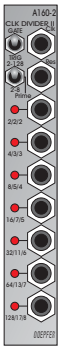
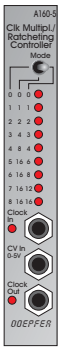
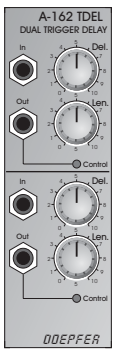
Module	Sketch	Description	Controls	In/Outputs
A-143-9 **Width:** **8 HP** **Current:** **30 mA**		**Quadrature LFO/VCO** the term "quadrature oscillator" means that sine and cosine outputs are simultaneously available, used e.g. for frequency shifter, special control voltage (crossfading/morphing) or 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 **Width:** **8 HP** **Current:** **40 mA**		**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 **Width:** **8 HP** **Current:** **30 mA**		**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 **Width:** **8 HP** **Current:** **20 mA**		**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
A-147-2 **Width:** **8 HP** **Current:** **~ 50 mA**		**VC DLFO** voltage-controlled modulation oscillator with 4 waveforms: triangle, square, sine and saw frequency can be controlled manually and via external CV input with attenuator/polarizer (selectable via switch) LFO Reset input Voltage controlled delay for slowly increasing LFO level (VCA with linear attack generator with Reset and CV input) Separate signal input/output/CV input for the level VCA VCA can be switched to “normal” VCA or VC polarizer 4 LEDs for triangle/sine, square, sawtooth and Delay CV VCA and VC Attack generator can be used also for other applications	• Frequency • CV • CV Mode (switch) • Delay Time • VCA Mode (switch) • 4 LEDs	• LFO CV • LFO Reset • Sine • Triangle • Rectangle • Saw • Delay CV • Delay Reset • Delay Voltage • VCA CV In • VCA Signal In • VCA Signal Out

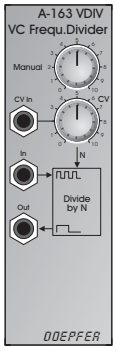
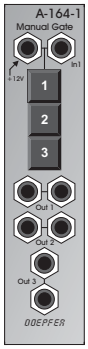
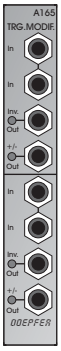
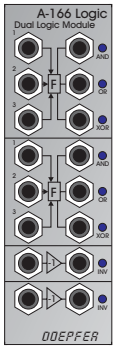
Module	Sketch	Description	Controls	In/Outputs
A-148 **Width:** **4 HP** **Current:** **20 mA**		**Dual S&H / T&H** 2 separate sample & hold / track & hold units for generating staircase-type control voltages in combination with other modulation sources (e.g. LFO, Random, ADSR, Theremin); the signal at 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 T&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)	each S&H • + / - Control (2x LED) • (internal jumper to select between S&H and T&H)	each S&H: • Trigger In • Sample In • S&H Out
A-149-1 **Width:** **12 HP** **Current:** **40 mA** **A-149-2** **Width:** **4 HP** **Current:** **40 mA**		**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 ext. 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 ext. control voltage, 256 possible states for both outputs	A-149-1: • CVN • Man N • QRV N+1 (LED) • QRV 2^N (LED) • CVD • Man D • SRV 1 (LED) • SRV 2 (LED) A-149-2 • Out 1...8 (8x LED)	A-149-1: • CVN In • QRV Clk In • QRV N+1 Out • QRV 2^N Out • CVD In • SRV Clk In • SRV 1 Out • SRV 2 Out A-149-2 • Out 1...8
		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.	*More detailed information about the module is available on our web site*	
A-150 **Width:** **4 HP** **Current:** **30 mA**		**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	per VCS: • I/O 1 (LED) • I/O 2 (LED)	per VCS: • CV • O/I • I/O 1 • I/O 2
A-151 **Width:** **4 HP** **Current:** **20 mA**		**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 (only for version 2) applications: automatic switching of modulation sources, VCO waveforms, filter outputs of multimode filter, audio sources or control voltages, rotary switching of one (audio-) source to four output channels, waveshaping and many more	• Steps (switch) • I/O 1 (LED) • I/O 2 (LED) • I/O 3 (LED) • I/O 4 (LED)	• Trigger In • Reset In • Common O/I • I/O 1 • I/O 2 • I/O 3 • I/O 4
A-152 **Width:** **16 TE** **Current:** **40 mA**		**Voltage Addressed S&H/Switch** 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.	• Address (manual) • CV Address • 1...8 (8 LEDs)	• Address CV In • Clock In • Reset In • Common Switch In/Out • 8 x Switch Out/In • Common S&H In • 8 x S&H Out • 8 x Digital Out
			More detailed information about the module is available on our web site	

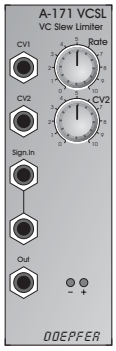
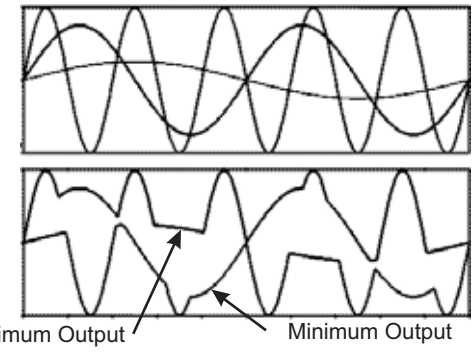
Module	Sketch	Description	Controls	In/Outputs
A-154 **Width:** **22 TE** **Current:** **60 mA**		**A-154: Sequencer Controller** Expansion module for the sequencer A-155 for additional functions: • running modes: forward, backward, pendulum, random and voltage controlled addressing • all modes even as "one shot" available (exept CV adressed 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	• Manual Mode • Mode CV • Mode Display (6 LEDs) • Manual First/Addr. • CV First/Addr. • Manual Last • CV Last • Manual Clock • CV Clock • Manual PW • CV PW • 8/16 Step (switch) • 9-16/A3 (LED) • Clock (LED) • Start,Stop,Step Reset (buttons) • A-154 Master (switch)	• Mode CV • First/Addr. CV • Last CV • Clock CV • PW CV • 9-16/A3 Out • 2 x Clock Out • Start, Stop, Reset, Step (input sockets) • A-154 Master (socket)

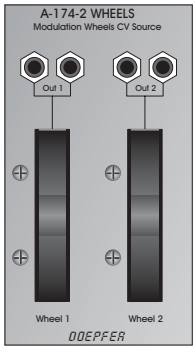
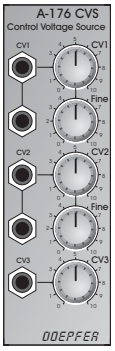
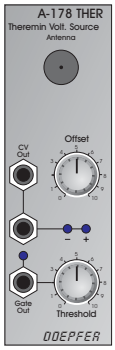
- internal voltage controlled clock generator with manual tempo and CV controlled tempo (with attenuator), clock display with LED, the internal clock is normalled to the clock input of the control section, if the CV input of the clock unit is connected to one of the CV outputs of the A-155 the time for each step can be adjusted separately, even jumps (step skipping) are possible as beyond a certain level the clock unit generates an immediate jump (i.e. a very short clock signal), for this skipping function e.g. the gate row of the A-155 can be used.
- manual and CV controlled pulsewidth (PW) of the clock generator, this function allows gates with different length for each step (but with the same tempo), one of the CV rows of the A-155 can be used for this feature or external modulation sources like LFO or random CV.
- 8/16 step mode: the "16 step" mode requires two A-155 and at least one voltage controlled switch A-150 to switch between the CV/trigger/gate outputs of the first (1...8) and second A-155 (9...16). The A-150 is controlled by the A3 output of the A-154.
- A-154 master switch: switches between A-154 control of the A-155 and the "old" A-155 control

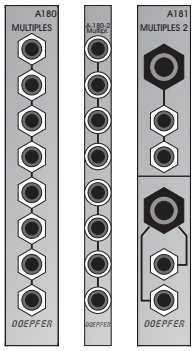
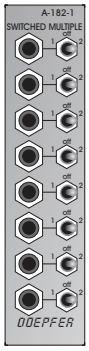
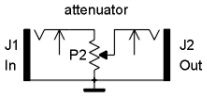
A-155 **Width:** **50 HP** **Current:** **100 mA**	 **Analog and Trigger Sequencer** • Sequencer generating analog control voltages and trigger signals • 8 steps with LED display of the current selected step • 3 trigger rows + 1 gate row controlled by 2 rows of 8 three-position switches (1-0-1) • LED 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	• 8xStep-LED • 3xTrigger LED • 1xGate LED • 2x8 Trigger switch • 2x8 analog step • 2xGlide Time • 1xRange (switch) • 1xRange (knob) • Start button • Stop button • Step button • Reset button	• 8xCV/Audio-In • Start In • Stop In • Reset In • Step In • Trig. 1 Out • Trig. 2 Out • Trig. 3 Out • Gate Out • Pre Out 1 • Pre Out 2 • Post Out 1 • Post Out 2 • S&H In 1 • S&H In 2 • Glide In 1 • Glide In 2
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	• 3 mode switches	• 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)

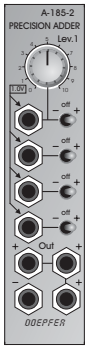
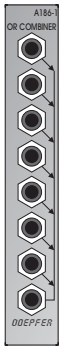
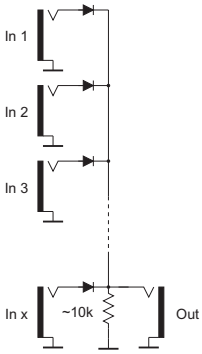
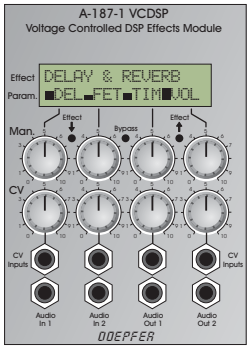
Module	Sketch	Description	Controls	In/Outputs
A-160-1 **Width:** **4 HP** **Current:** **40 mA**		**Clock Divider** frequency divider especially for clock/gate/trigger signals, for example if lower (i.e. divided) clock frequencies are required in the system for synchronising purposes; especially for 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)	• /2 (LED) • /4 (LED) • /8 (LED) • /16 (LED) • /32 (LED) • /64 (LED)	• Trigger In • Reset In • /2 • /4 • /8 • /16 • /32 • /64
A-160-2 **Width:** **4 HP** **Current:** **? mA**		**Clock Divider II** enhanced clock divider with 3 different sets of dividing factors: integer / power of two / prime numbers 2 output modes: gate or trigger (trigger = gate or-wired with clock input signal) Clock input Reset input 7 divided Clock outputs with LED displays additional modes can be selected via internal jumpers, e.g. clock polarity, output polarity, reset behaviour (level or edge trigger) and reset polarity.	• Gate/Trigger (switch) • Dividing Set (switch) • 7 Output LEDs) • several internal jumpers	• Clock In • Reset In • 7 divided Clock outputs
A-160-5 **Width:** **4 HP** **Current:** **? mA**		**Clock Multiplier / Ratcheting Controller** frequency multiplier for clock signals 3 different sets of multiplication factors via switch selectable the multiplication factor depends upon the voltage applied to the CV input (range 0 ... +5V) and the selected set the current multiplication factor is displayed with 9 LEDs Clock Input with LED / Clock Output with LED/ CV Input Application: all kind of clock multiplication, ratcheting sequences (i.e. None, one or more gate signal for each step of the sequence by controlling the A-160-5 by one CV output of the sequencer)	• Mode (switch) • Clock In (LED) • Clock Out (LED) • Factor (9 LEDs))	• Clock In • CV In • Clock Out
A-161-1 **Width:** **4 HP** **Current:** **20 mA**		**Clock Sequencer** expansion modul 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	• 1 (LED) • 2 (LED) • 3 (LED) • 4 (LED) • 5 (LED) • 6 (LED) • 7 (LED) • 8 (LED) *requires A-160-1 next to the A-161 !*	• Out 1 • Out 2 • Out 3 • Out 4 • Out 5 • Out 6 • Out 7 • Out 8
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	per Delay: • Delay Time • Length • Control (LED)	per Delay: • In • Out

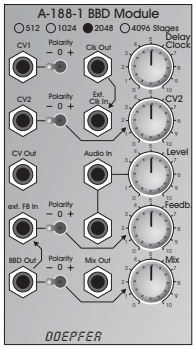
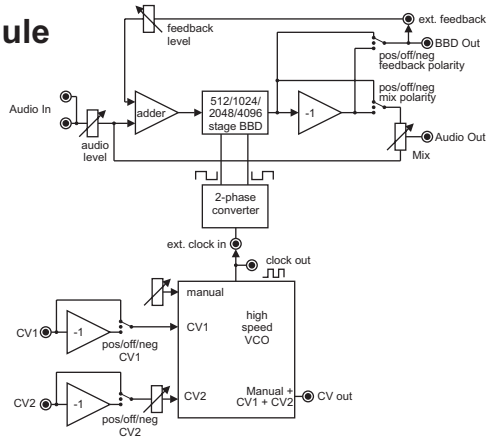
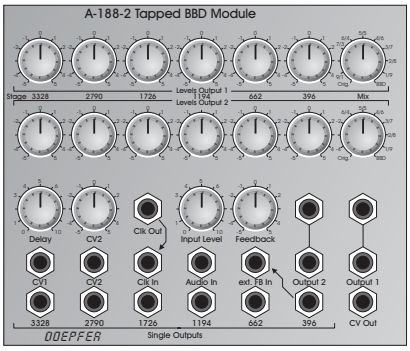
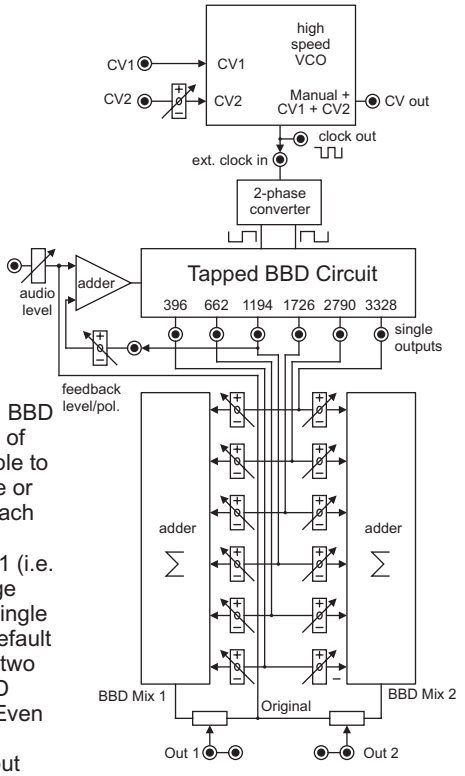
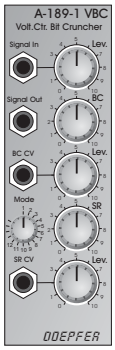
Module	Sketch	Description	Controls	In/Outputs
A-163 **Width:** **8 HP** **Current:** **40 mA**		**A-163 Voltage Contr. Divider** frequency of the input signal (e.g. rectangle from a VCO) is divided by an integer factor N (1 . . . 20). N can be adjusted manually and modulated with an external control 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).	• Manual N • CV (attenuator)	• CV In • Audio In (rectangle) • Audio Out
A-164-1 **Width:** **6 HP** **Current:** **20 mA**		**Manual Gate** 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.	• "1" • "2" • "3" (momentary switches)	• In 1 (2x) • Gate Out 1 (2x) • Gate Out 2 (2x) • Gate Out 3 (2x)
A-165 **Width:** **4 HP** **Current:** **20 mA**		**Dual Trigger Modifier** 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: • LED for inverse output • LED for +/- pulse output	per Modifier: • 2x In • Inverse Out • +/- Out
A-166 **Width:** **8 HP** **Current:** **40 mA**		**Logic Module** 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 avaliable 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 "gated" clocks or certain rhythmic patterns	each unit: • AND (LED) • OR (LED) • EXOR (LED) each inverter • LED	each unit: • IN1 • IN2 • IN3 • AND (OUT) • OR (OUT) • EXOR (OUT) each inverter: • IN • OUT
A-167 **Width:** **8 HP** **Current:** **20 mA**		**Analog Comparator** compares analog voltages and derives a gate signal; internally the module generates the voltage k1*(+In) - k2*(-In) + Offset (available at the output *analog sum*) and und sets or resets the gate output depending on the result of this internal voltage (>0V or <0V). k1 and k2 represent the manual attenuators. A LED shows gate state. The Gap control is used to adjust a so-called "hysteresis" (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	• + In • - In • Offset • Gap • Function (LED)	• + In • - In • Analog Sum • Comp. Out • Inv. Comp. Out

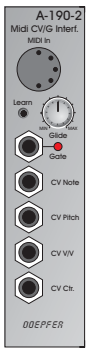
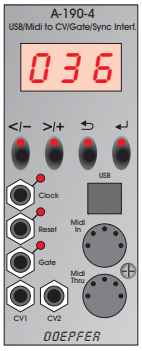
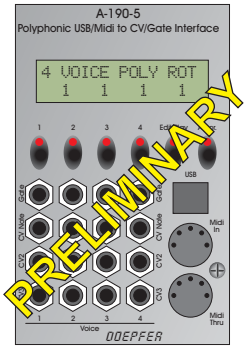
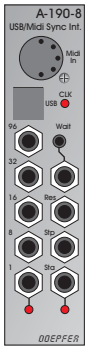
Module	Sketch	Description	Controls	In/Outputs
A-170 **Width:** **8 HP** **Current:** **20 mA**		**Dual Slew Limiter SL** 2 separate slew limiters (portamento controllers, AR generators) • unit 1: one common control for rise/fall time (about 0 ... 10 sec.); • unit 2: two separate controls for rise and fall time and may be used as a simple AR envelope generator (input = gate); time range of unit 2 is switchable in 3 ranges applications: portamento, AR generator	**Unit 1:** • Time • 2x Control-LED **Unit 2:** • Rise Time • Fall Time • Time Range • 2x Control-LED	**Unit 1:** • In • Out **Unit 2:** • In • Out
A-171 **Width:** **8 HP** **Current:** **20 mA**		**Voltage Controlled Slew Limiter** slew limiter with voltage controlled slew rate (portamento controller, AR generator), slew time (about 0.01 ... 10 sec.) can be adjusted manually as well as per control voltage at the CV inputs (one with attenuator), 2 control LEDs for display of rise/fall	• Slew Time • CV 2 • 2x Control-LED	• CV 1 • CV 2 • 2x Signal In • Out
A-171-2 **Width:** **8 HP** **Current:** **30 mA**		**Universal VC Slew Processor/Generator** authorized copy of the famous Serge VCS voltage controlled slew limiter with a lot of additional features independent manual controls and CV inputs for rising and falling slew time independent switches for linear/exponential behaviour of up/down section Slew Input, Exp. CV Input, Trigger Input, Cycle switch, End Output, Signal Output Applications: VC slew limiter, VCLFO, VCO, VC envelope generator, Subharmonic Generator, Lowpass Gate, VC Portamento, Pulse Delay	• Rise Time • CV Rise • lin./exp. Rise (switch) • Fall Time • CV Fall • lin./exp. Fall (switch) • Cycle (switch) • Control LED	• Signal In • CV Rise • CV Fall • Exp. CV • Trig. In • End Out • Signal Out
A-172 **Width:** **4 TE** **Current:** **10 mA**		**A-172: Max/Min Selector** 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. The main application of the module is the processing/mixing of control voltages, e.g. random voltages, ADSR, LFO, S&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. +/- LED display for each output 	• Max display (- LED / + LED) • Min display (- LED / + LED)	• In 1 ... 4 • Max Out • Min Out
A-174-1 **Width:** **10 HP** **Current:** **40 mA**		**Joystick** 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. 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	• Joystick • X-Offset • Y-Offset • -Y (LED) • +Y (LED) • -X (LED) • +X (LED)	• CV Y • CV X

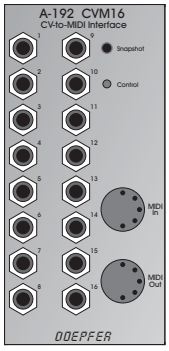
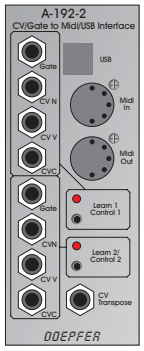
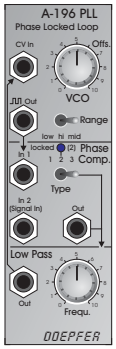
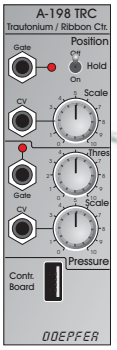
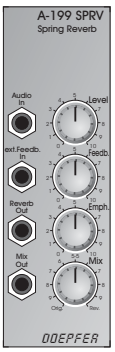
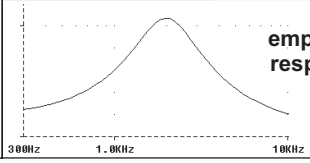
Module	Sketch	Description	Controls	In/Outputs
A-174-2 **Width:** **14 + 2 HP** **Current:** **10 mA**		**Wheels Module** left wheel without spring (no self-center function), voltage range about 0...+5V, e.g. as modulation wheel, right wheel is spring-loaded (i.e. self-center function), voltage range about -3 ... + 3V, e.g. as pitch bender, 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 2 HP blind panel on left side required (or module with sufficient space, e.g. A-174-1)	• Wheel 1 • Wheel 2	• Out 1 (2x) • Out 2 (2x)
A-175 **Width:** **4 HP** **Current:** **20 mA**		**Dual Voltage Inverter** 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)	per Inverter: • + / - LED's	per Inverter: • 2 x In (connected) • Inverse Out
A-176 **Width:** **8 HP** **Current:** **20 mA**		**Control Voltage Source CVS** provides 3 manually adjustable control voltages, 2 of them having an additional "fine" control (e.g. for exact tuning of VCO frequency)	• CV 1 • CV 1 fine • CV 2 • CV 2 fine • CV 3	• 2x CV 1 • 2x CV 2 • CV 3
A-177-2 **Width:** **4 HP** **Current:** **10 mA**		**External Foot Controller II** economically priced foot controller interface one 1/4" input for continuous foot controller (e.g. Doepfer FP5), continuous CV output range about 0 ... +6V, one 1/4" input for double foot switch (e.g. Doepfer VFP2), voltage range for the two switched outputs 0/+10V 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		• foot control input (1/4") • foot control output (2 x 3.5 mm) • double foot switch input (1/4") • 2 x foot switch output (3.5 mm)
A-178 **Width:** **8 HP** **Current:** **60 mA**		**Theremin Module THER** 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 theshold (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	• CV offset • Gate threshold • 2xCV LED (pos./neg.) • Gate LED	• Antenna In • 2x CV out • Gate out

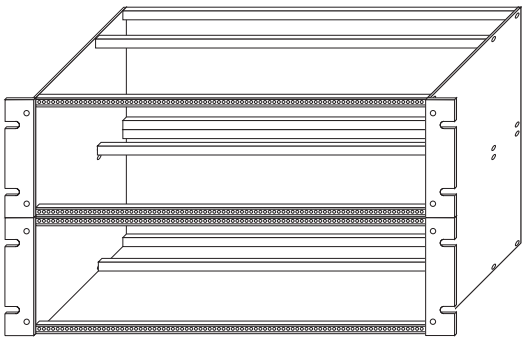
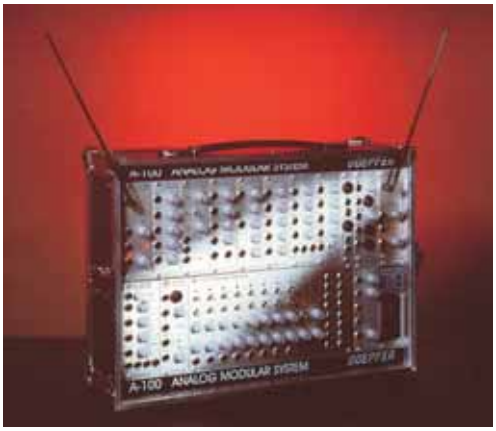
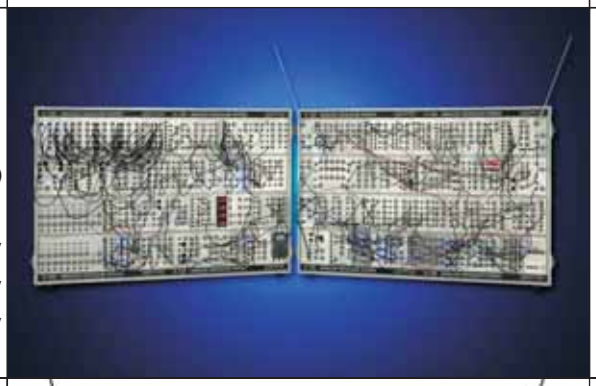
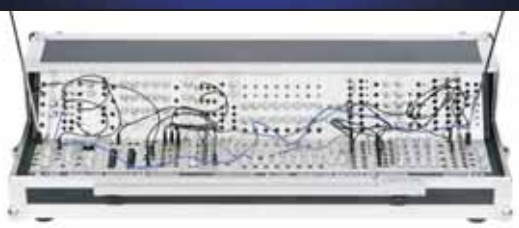
Module	Sketch	Description	Controls	In/Outputs
A-180-1 **Width:** **4 HP** **A-180-2** **Width:** **2 HP** **A-181** **Width:** **4 HP**		**A-180-1 / A-180-2: Multiples I** 2 x 4 connected jacks (optionally 8 connected jacks via jumper) **A-181: Multiples 2** 1/4“ - 3.5mm multiple, 2 separate multiples with one 1/4“ and two 3.5mm jack sockets, one is wired mono, the second stereo		• 8 x 3.5 mm jack sockets
A-182-1 **Width:** **6 HP** **Current:** **0 mA**		**Switched Multiple** simple passive multi-connector similar to the multiples module A-180, in contrast to module A-180 each socket is equipped with a 3-position switch that allows to connect the corresponding socket to the internal line #1 (left), line #2 (right) or to turn the socket off (center), some examples: - all switches left (or right): 8-fold multiple - four switches left, four switches right: two 4-fold multiple - X switches left, Y switches right, Z switches center: two separate multiples with some sockets turned off	• 1-off-2 (switch) (8x)	• In / Out (8x)
A-183-1 **Width:** **4 HP** **Current:** **0 mA**		**Dual Attenuator** two simple passive attenuators with one input and one output, 50k linear potentiometers, no active parts like amplifiers or buffers and therefore no power supply is required 	• Level 1 • Level 2	• In 1 • Out 1 • In 2 • Out 2
A-183-2 **Width:** **4 HP** **Current:** **10 mA**		**Offset Generator/Polarizer/Atten.** simple voltage offset generator combined with an attenuator/polarizer, a switch is used to select between *Attenuator* or *Polarizer* function for the input control, the output is a DC voltage that is adjusted with the Offset control (0...+5V/-5V...+5V jumper selectable). It is overlaid by the attenuated/ polarized voltage that is fed to the *In* socket. <u>*Attenuator*</u> mode: control works as an usual attenuator, <u>*Polarizer*</u> mode: zero level appears at the center position, right from center the signal is added to the DC, left from center the signal is subtracted from the DC offset.	• Offset • Attenuator • Att./Pol. (toggle switch)	• In • Out (2x)
A-183-3 **Width:** **4 HP** **Current:** **20 mA**		**Amplifier** simple DC coupled amplifier, suitable for CV and audio signals, the maximal amplification can be switched between 1, 2 and 4, the actual level is adjusted by means of the *Level* control between zero and the chosen maximim amplification (1/2/4), two overload LEDs indicate if the output signal exceeds about +10V/-10V. <u>main application</u>: adaption of differing audio or CV levels between modules or systems (e.g. LFO, ADSR or Gate levels between modules of different manufacturers). Even audio signals can be attenuated/amplified but the module is not planned as an amplifer for external low level audio signals (e.g. microphones or electric guitars)	• Level • Maximal Amplification (Toggle Switch) • Overload (2 LEDs)	• In (2x) • Out (2x)

Module	Sketch	Description	Controls	In/Outputs
A-185-1 **Width:** **4 HP** **Current:** **30 mA**		**Bus Access Module BAC** provides access to the Gate and CV signals of the system-bus (input as well as output); active module with signal-refreshing amplifiers (e.g. when using a common system bus with multiple base frames) Applications: feeding CV and Gate from one frame to another (e.g. CV and Gate from an A-190 to another frame), avoiding signal losses if many CV consumers are connected to the same bus (e.g. many A-110 or A-111 on the same bus)	• Gate (LED) • CV (LED)	• CV In • 2 x CV Out • Gate In • 2 x Gate Out
A-185-2 **Width:** **6 HP** **Current:** **? mA**		**Precision Adder / Bus Access** precision control voltage adder/buffer with exact 1.00 amplification, suitable to add CVs for pitch control of VCOs (e.g. keyboard + sequencer), in 1 has an attenuator and is planned for modulations (e.g. LFO) with adjustable depth, a three-position switch for each input determines if the CV is added, subtracted or ignored, inputs are normalled to +1.00V (if no plug is inserted the corresponding switch works as an +/0/- octave switch), 3 non-inverted and one inverted output are available, an internal jumper can be used to connect the output to the internal CV line of the A-100 bus.	• Lev. 1 • -/off/+ 1 • -/off/+ 2 • -/off/+ 3 • -/off/+ 4 (toggle switches)	• CV In 1 • CV In 2 • CV In 3 • CV In 4 • non-inverted CV Out (3x) • inverted CV Out
A-186-1 **Width:** **4 HP** **Current:** **0 mA**		**Gate/Trigger Combiner** simple passive module that combines up to 7 gate or trigger signals by or-wiring with diodes. Function: - if all seven inputs are low (or open) the output is low - if one or more of the inputs is "high" the output turns high 		• In 1 to 7 • Out
A-187-1 **Width:** **18 HP** **Current:** **200 mA**		**DSP Effects Module** DSP based effects module with voltage control of four parameters of the selected digital effect (with manual control and CV input with attenuator for each parameter). The effect (e.g. reverb, delay, pitch-shifter, distortion, equalizer) is selected by two momentary switches (up/down). In addition a momentary switch for bypass on/off is available. The selected effect and the four parameters are shown in the LC display (2 lines/16 characters). A list with the available effects and voltage controlled parameters is available on our website.	• Up • Down • Bypass • Audio Level • Param. 1 (man.) • Param. 1 (CV) • Param. 2 (man.) • Param. 2 (CV) • Param. 3 (man.) • Param. 3 (CV) • Param. 4 (man.) • Param. 4 (CV)	• Audio In • Audio Out • CV Param. 1 • CV Param. 2 • CV Param. 3 • CV Param. 4

Module	Sketch	Description	Controls	In/Outputs
A-188-1 **X: 128 stages (*)** **Y: 256 stages (*)** **A: 512 stages (*)** **B: 1024 stages (S)** **C: 2048 stages (S)** **D: 4096 stages (*)** **(*) = available while stocks last** **(S) = standard product, no limitations** **Width: 14 HP** **Current: 50 mA**	 We recommend to visit our website www.doepfer.com for more details and sound examples.	**BBD Module**  complex BBD (bucket brigade device) module with a lot of parameters and extreme clock/delay range, can be used for standard applications like flanging, chorus, analog delay but even to generate Very extreme and strange sounds especially at low clock settings, available with different BBD circuits (128/256/512/1024/2048/4096 stages, also suitable for Karplus-Strong synthesis, contains essentially a high speed VCO for the BBD clock and the BBD circuit with several mixing, normalling and polarity switching features	• Delay Clock • CV1 Polarity • CV2 Polarity • CV2 Level • Audio Level • Feedback Polarity • Feedback Level • Mix Polarity • Mix (Original/BBD)	• CV1 In • CV2 In • CV Out • Clock Out • Clock In (normalled to Clock Out) • Audio In (2x) • BBD Out • Feedback In (normalled to BBD Out) • Mix Out
A-188-2 **Width: 30 HP** **Current: 120 mA**	 **Tapped BBD Module** extremely versatile module with a tapped BBD (bucket brigade device) as its core. Each of the six taps has two level controls available to add the corresponding tap output positive or negative to one of the two mix busses. Each mix has a separate wet/dry control. The clock/delay range is similar to the A-188-1 (i.e. extreme wide range, manually and voltage controlled). One of the mix outputs or a single tap can be used for the feedback loop (default = tap #1). Because of the 6 taps and the two mix busses very complex and dense BBD effects can be realized - even in stereo. Even the standard BBD effects are possible (flanging, chorus, analog delay, reverb) but with extreme possibilities.	 Visit our website www.doepfer.com for more details and sound examples.	• 3328 mix 1 • 2790 mix 1 • 1726 mix 1 • 1194 mix 1 • 662 mix 1 • 396 mix 1 • 3328 mix 2 • 2790 mix 2 • 1726 mix 2 • 1194 mix 2 • 662 mix 2 • 396 mix 2 • Wet/Dry 1 • Wet/Dry 2 • Delay (Clock) • CV2 Level • Input Level • Feedback	• 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) • Audio In • Feedback In (normalled to 396 Out) • Mix Out 1 (2x) • Mix Out 2 (2x)
A-189-1 **Width: 8 HP** **Current: 50 mA**		**Voltage Controlled Bit Modifier** 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.	• Signal Level • Manual Bit Modulation • CV Bit Modulation • Manual Sample Rate • CV Sample Rate • Mode (rotary switch)	• Signal In • CV Bit Modulation • CV Sample Rate • Signal Out

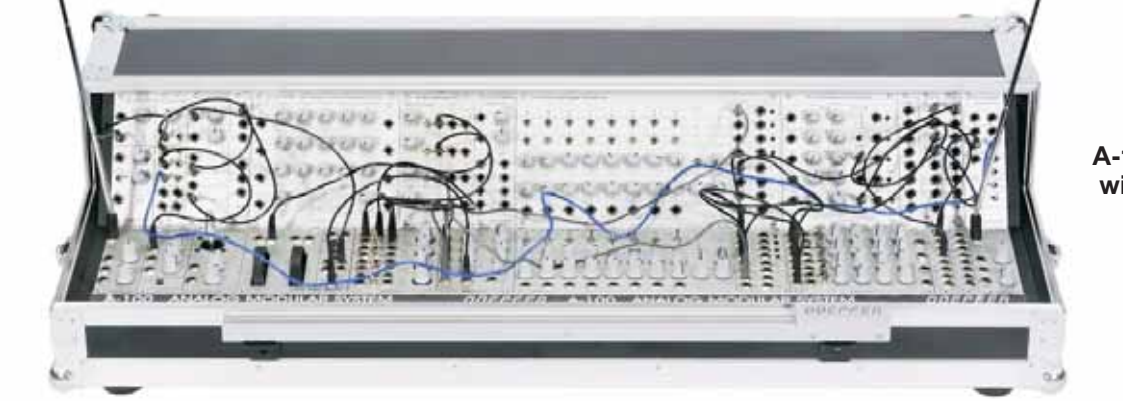
Module	Sketch	Description	Controls	In/Outputs
A-190-2 **Width:** **6 HP** **Current:** **50 mA**		**Low Cost Midi-CV/Gate Interface** • economically priced Midi-to-CV/Gate interface • modular version of the MCV4 • CV note (controlled by note messages) • CV pitch (controlled by pitch bend messages) • 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	• Learn (momentary switch) • Gate (LED) • Glide CV1	• Midi In • Gate • CV note • CV pitch • CV V/V • CV Contr.
A-190-3 **Width:** **6 HP** **Current:** **50 mA**		**USB/Midi-to-CV/Gate Interface** • economically priced CV/Gate interface with both USB and Midi In • same functions as A-190-2, i.e. • 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	• Learn (momentary switch) • Gate (LED) • Glide CV1	• USB • Midi In • Gate • CV note • CV pitch • CV V/V • CV Contr.
A-190-4 **Width:** **10 HP** **Current:** **200 mA**		**USB/Midi-CV/Gate/Sync Interface** • two CV outputs with 12 bits resolution • output #1 for VCO control (1V/Oct.) controlled by Midi note on/off and pitch bend • output #2 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 4 buttons with LEDs at the front panel (incl. CV scale, no trimmers) • Midi controlled LFO and glide (software generated)	• four buttons with integrated LEDs • 3 digit LED display • Gate (LED) • Clock (LED) • Reset (LED)	• USB • Midi In • Midi Out • Cv1 • CV2 • Gate • Reset • Clock
A-190-5 **Width:** **16 HP** **Current:** **? mA**		**Polyphonic USB/Midi-to-CV/Gate Interface** •different operation modes, e.g. • four voice polyphonic (one Midi channel) with different assign algorithms • four voice monophonic (four Midi channels) • unisono •3 CV and 1 gate outputs for each voice •operation via LC display and 6 control buttons with LEDs •Gate displays with LEDs	• 6 buttons with LEDs	• USB • Midi In • Midi Out • 4x (CV1/CV2/ CV3/Gate)
A-190-8 **Width:** **6 HP** **Current:** **50 mA**		**USB/Midi-to-Sync Interface** • converts the Midi real time messages Clock, Start and Stop into the corresponding analog signals with different sub-clocks • simultaneous Clock outputs with 96, 32, 16, 8 and 1 pulses per measure (corresponds to dividing factors 1, 3, 6, 12 and 96 with reference to Midi clock) • Start / Stop / Reset Outputs • Wait function via button and Gate input: when Wait is triggered all clocks outputs stop until the next measure begins • LED displays for Clock, Start/Stop and Measure (”1”)	• Wait (momentary switch) • Clock (LED) • Measure / “1” (LED) • Start/Stop (LED)	• USB • Midi In • Clock 96 • Clock 32 • Clock 16 • Clock 8 • Measure / “1” • Wait • Reset • Start • Stop

Module	Sketch	Description	Controls	In/Outputs
A-192-1 **Width:** **12 HP** **Current:** **100 mA**		**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 merging, 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).	• Snapshot (push button) • Control (LED) • Preset (DIP switch on the pc board, module has to be removed for access)	• 16 x CV In (0...+5V) • MIDI In • MIDI Out/Thru
A-192-2 **Width:** **10 HP** **Current:** **70 mA**		**Dual CV/Gate-to-Midi/USB Interface** converts Gate and CV signals (e.g. from an analog sequencer) into the corresponding note on/off Midi messages and additional control change messages For each unit these inputs are available: Gate (the rising edge of the Gate signal trigger the note on message, the falling edge the note off message) CVN (defines the note number of the Midi note message during the rising edge of the Gate signal) CVV (defines the velocity of the note messages) CVC (auxiliary CV can be assigned to an Midi CC) Learn functions for each unit Common transpose input for both units	• Learn #1 (push button and LED) • Learn #2 (push button and LED)	• USB • Midi In • Midi Out • CV Transpose For each unit: • Gate • CVN • CVV • CVC
A-196 **Width:** **8 HP** **Current:** **30 mA**		**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 normalled 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 frequeny 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	VCO: • Offset • Range Detector: • Type Low Pass: • Frequency	VCO: • CV In • Out Detector: • In 1 • In 2 • Out Low Pass: • Out
Detailed information about the module including sound and patch examples is available on our web site				
A-198 **Module** **Width:** **8 HP** **Current:** **40 mA** Available even as stand alone MIDI version with some additional features: **MIDI Ribbon Controller R2M**		**A-198 Trautonium/Ribbon Manual** 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! **Manual ca. 600 x 30 x 30 mm** The complete unit consists of manual and module.	Position: • Scale • Hold on/off • LED (Gate) Pressure: • Scale • Threshold • LED (Gate)	• Position CV • Position Gate • Pressure CV • Pressure Gate • Manual
A-199 **Width:** **8 HP** **Current:** **80 mA**		**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	• Level (input level) • Feedback • Emphasis • Mix 	• Audio In • Feedback In (normalled “switched” socket) • Reverb Out • Mix Out

Product	Sketch	Description
A-100G6 **Width:** **2 x 84 HP** **Current:** **1200 mA @+/-12V (Source)**		**Rack Mountable Basic Frame 6U/84HP** empty 19“ rackmount case (subrack), width about 482 mm, height about 264 mm, depth about 240mm, 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, 1 back panel 3U (blind), 1 back panel 3U with power supply, used for A-100 basic system 1 and 2
A-100P6 **A-100P9** **A-100PB** **Width:** **2 x 84 HP (P6, PB)** **or** **3 x 84 HP (P9)** **Current:** **1200 mA @+/-12V (Source)**	 Theremin/Sequencer system with two A-178 in the upper row and an A-155 in the lower row.	**Suitcase Versions** Portable versions of A-100G6, available with 6U (2x3U),9U (3x3U) and as a base version with 2x3U (same as monster base but only 84HP), measures: about 460 mm (width) x 330/465 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, assembled and tested, for plug-in of the desired modules, 84 HP effective width,  The left picture shows a Theremin/ Sequencer application with two A-178 in the upper row and an A-155 in the lower Row. The right picture shows an A-100PB with built-in modules.
A-100LC3 **A-100LC6** **A-100LC9** **A-100LCB** **Width:** **LC3: 1x84 HP** **LC6: 2x84 HP** **LC9: 3x84 HP** **LCB: 2x84HP** **Current:** **1200 mA @+/-12V (Source)**		**Low cost open versions** similar to the portable suitcase described above but open versions with 3, 2x3, 6 or 9 HU, no front cover, no handle, made of raw wood (no lacquer)  A-100LCB is the base version (similar to A-100PB/A-100PMB but made of raw wood and without cover)
A-100 **PMS6/9/12** **PMD12** **Width:** **2x168HP (PMS6)** **3x168HP (PMS9)** **4x168HP (PMS12)** **2x4x168 HP (PMD12)** **Current:** **2400 mA @+/-12V (PMS6/9)** **4800 mA @+/-12V (PMS12)** **9600 mA @+/-12V (PMD12)** **(Source)**		**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: **Case Version / Power Supplies / Bus boards / Total Current** A-100PMS6 / 2 / 4 / 2400 A-100PMS9 / 2 / 6 / 2400 A-100PMS12 / 4 / 8 / 4800 A-100PMD12 / 8 / 16 / 9600 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 **PMB** **Width:** **2x168 HP** **2400 mA @+/-12V (Source)**		**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 removeable 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).  

Product	Sketch	Description
A-100 MC **Width:** **32 HP** **200 mA @+/-12V** **50 mA @+5V** **(Source)**		**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 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 **Current:** **1200 mA @+/-12V** **(Source)**	 *even suitable for high end applications (same power supply quality as A-100 PSU2, but external transformer)*	**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 AC 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 BUS	**Bus board:** one assembled and tested bus board, e.g. for customers who own a 19“ 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)	
A-100 PSU2	**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	
A-100 DIY PSU	**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.	
A-100 AD5	**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, the current is taken from the 12V supply !	
A-100 MNT	**Miniature Power supply and bus bord:** +/-12V @ 200mA and +5V @ 50mA power supply with integrated bus board, 4module connectors, especially for applications with only one or a few modules (max. 200mA, max. 4 modules), requires an AC/AC adaptor with 7...9V AC output (not DC), available with or without AC/AC adapter	
A-100 B1 ... 42	**Blind front panels:** B1: 1 HP, B1.5: 1.5 HP, B2: 2 HP, B4: 4 HP, B8: 8 HP, B42: 42 HP	
A-100 C...	**Patch cords:** available in different length, 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 -> 1/4" available (1.5m, black)	
A-100 OPM	**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 aranged systems are ordered, available in German or English. Single manuals are only available for free download on our website but not as printed documents !	

Products in shaded areas are suitable for qualified personnel only because of electrical safety (dangerous mains voltage 115V / 230V).



A-100 Monster Base Frame with two Theremins A-178 on left/right side

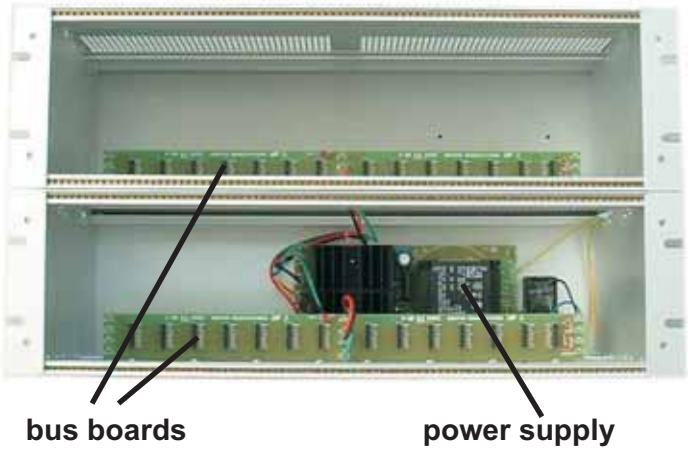
A-100 Planning

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 built 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

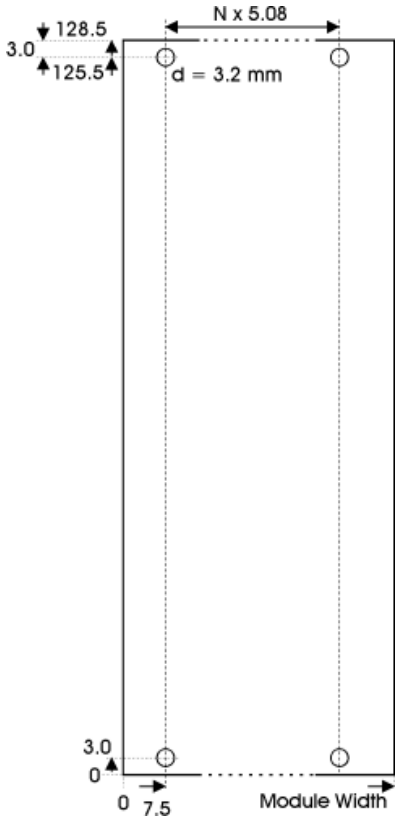
The construction of the A-100 modular system is based on the international standard **19" rack system** (DIN 41494 / IEC 297-3 / IEEE 1001.1). First of all an empty frame with power supply and bus boards is required. This can be filled with the desired modules. The **standard 6U frame (A-100G6)** consists 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 (e.g. portable versions with 6U or 9U, open low cost versions with 6U and 9U, large "monster" suitcases with up to 12U and 168 HP, 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.

A-100G6



Module width overview

width [HP]	calculated width [mm]	actual width [mm]
1	5,08	**5,00**
2	10,16	**9,80**
4	20,32	**20,00**
8	40,64	**40,30**
10	50,80	**50,50**
12	60,96	**60,60**
14	71,12	**70,80**
16	81,28	**80,90**
20	101,60	**101,30**
21	106,68	**106,30**
22	111,76	**111,40**
28	142,24	**141,90**
42	213,36	**213,00**



Module dimensions and positions of the mounting holes

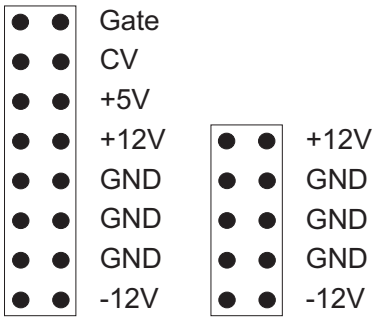
The standard rack system has a **usable width** of **84 HP** (= 426.4 mm). Individual **modules** can be fitted in any chosen layout into the 19" frame. If the modules don't use up the entire 84 HP, then the spaces have to be covered with **blanking panels** due to safety and EMC reasons. We offer blind panels with 1, 2, 4, 8 and 42 HP. In the description for each module (e.g. A-110-1) 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 built 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 from other manufactureres may also need +5V. The voltages are generated by the A-100 power supply A-100PSU2 and distributed to the bus boards. The 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-100P9). 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-110-2). For modules that require +5V the plug-in adaptor A-100AD5 is available (max. current 100 mA).

All cases available from us (A-100G6,A-100P6/P9/PB, A-100LC3/LC6/LC9/LCB and the A-100 monster cases A-100PMS6/PMS9/PMS12/PMD12)) are completely assembled and tested. They include the power supply (+/-12V), 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 deliveres +/-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 the A-100 DIY kit #1 available. It uses an external supply, i.e. there are no dangerous voltages acessible.

You may also purchase the **bus boards** and power supply A-100PSU2 separately so that you could use other frames. ***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 !

A-100 Basic Systems

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 a few 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-190-4 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 plan to expand the basic system we recommend to order the system already in a bigger case (e.g. A-100P9). Then there is an additional row left for future modules. But you may continue also with another additional 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.

- Small Starter System
- Miniature System
- Expansion Systems for the Basic Systems
- Sound Processing Systems
- Trautonium System
- Theremin Systems
- 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

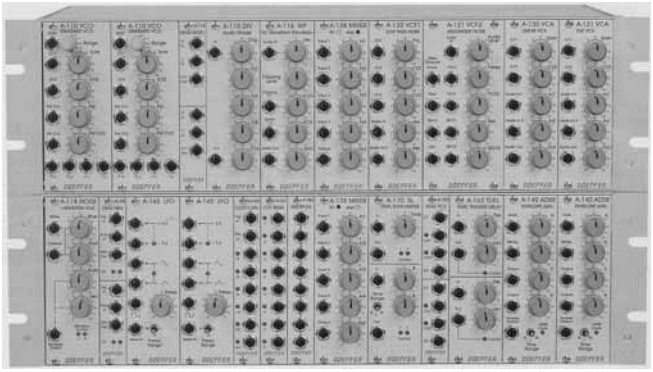
If you want to plan your specific system we ask you to pay attention to the remarks on the following pages.

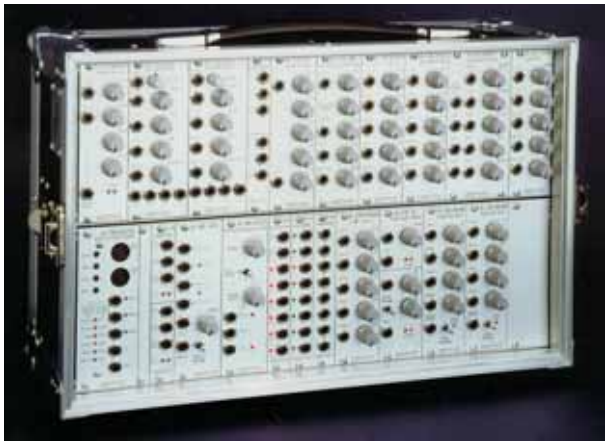
The pictures on the right side show a A-100 basic system built into a rack mountable frame (A-100G6, upper picture) and the suitcase version (A-100P6)

Quantity Basic System 1 (A-100BS1)	Quantity Basic System 2 (A-100BS2)	Module	Function	HP
2	2	A-110-1	VCO	20
1	1	A-114	Ring Modulator	4
1	1	A-115	Audio Divider	8
1	1	A-116	Waveform Processor	8
1	1	A-118	Noise/Random	8
1	1	A-120	24dB Low Pass	8
1	1	A-106-6	XP Multimode Filter	12
1	1	A-130	VCA lin.	8
1	1	A-131	VCA exp.	8
1	1	A-138a	Mixer lin.	8
1	1	A-138b	Mixer exp.	8
2	2	A-140	ADSR	16
2	1	A-145	LFO 1	16/8
-	1	A-146	LFO 2	8
1	1	A-148	S&H	4
1	-	A-150	VC Switches	4
1	1	A-160	Clock Divider	4
1	1	A-161	Clock Sequencer	4
1	-	A-162	Trigger Delay (*1)	8
1	1	A-170	Slew Limiter (*2)	8
1	1	A-180-1	Multiples I	4
-	1	A-190-4	Midi/USB-CV/Gate	10
-	1	BP2	Blind panel 2HP	2

(*1) not included in the suitcase version of Basic System 1

(*2) not included in the suitcase version of Basic System 2 with mains inlet at the front panel





MIDI Integration of the A-100

For integrating the A-100 into a MIDI system, the internal **MIDI interfaces A-190-2, A-190-3**, **A-190-4, A-190-5, A-190-8, A-192-1** and **A-192-2** or the external interfaces **MCV4, MSY2** and **Dark Link** are available.

The **MIDI analog sequencers MAQ 16/3** or **Dark Time** are the right choice if you love analog sequences controlled by MIDI. They are equipped with CV and Gate outputs which are compatible with the System A-100. Due to the MIDI and USB features they have some different features compared to A-155.

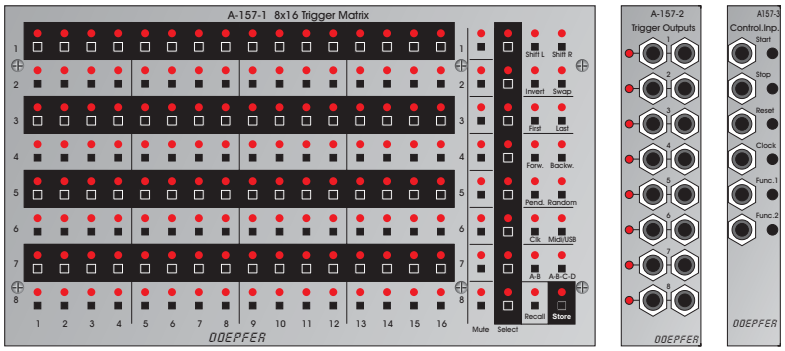
Even some of our OEM products (e.g. **MTV16**, **CTM64**, **MTC64**, **Pocket Electronic, Wheel Electronic, USB64, MKE, MBP25**) can be used in combination with A-100 to transmit or receive Midi data. For example the **MTC64** can be used to generate up to 64 gate signals controlled by Midi note messages and the **MKE** can be used as a keyboard to control the Midi interface **A-190-4**.

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.
Modules or systems do not include user's guides. These are available for free download from our website. The complete user's guide is available also in printed form (additional charges).
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).

Modules in planning stage

The following table shows some modules that are in the planning stage (as of January 2015). The specifications and release dates are still without obligation.

Module	
	**A-157 Trigger Sequencer Subsystem** A-157-1: basic button/LED unit of the A-157 system, made of 8 rows with 16 steps per row, momentary button and LED for each step (miniature "Schaltwerk") A-157-2: Trigger output module with LED display A-157-3: Control input module (Start, Stop, Reset, Clock ...)

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