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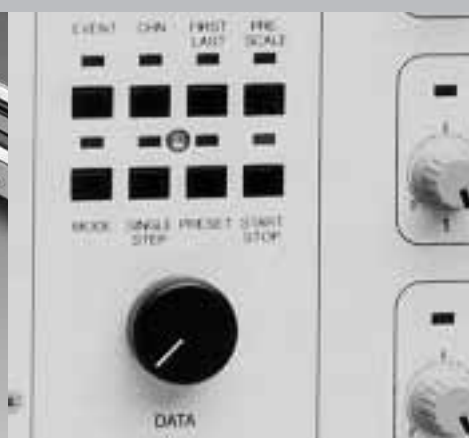
DARK ENERGY II

Monophic Analog Synthesizer with USB and Midi Interface

As the Dark Energy I had to be discontinued because an important electronic part (CEM3394) is no longer available we decided to do a redesign of the Dark Energy. The new Dark Energy II looks like the Dark Energy I at first sight. But the basic sound of Dark Energy II is clearly different from version I because of the new circuits for VCO, VCF and VCA. In the following description of the Dark Energy II the differences to Dark Energy I are marked blue:

Dark Energy II is a monophonic stand-alone synthesizer with USB and Midi interface. The sound generation and all modulation sources are 100% analog, only the USB/Midi interface contains digital components. Dark Energy is built into a rugged black metal case with wooden side plates. High quality potentiometers with metal shafts are used and each potentiometer - except the filter mode control - is fixed to the case (no wobbly shafts and knobs). The distance between the controls is a bit wider compared to A-100 modules and knobs with vintage look are used.

VCO
- Sawtooth based VCO core
- manual tune control (with an internal jumper the range can be set to ~ +/-1 half an octave or ~ +/-2.5 octaves)
- range switch -1 / 0 / +1 octave
- FM (frequency modulation) control with modulation source switch (LFO1 / off / ADSR)
- manual pulsewidth control for rectangle waveform
- PWM control with modulation source switch (LFO2 / off / ADSR)
- waveform switch (sawtooth / off / clipped/inverted sawtooth)   the sum of the waveform chosen by this switch and the rectangle is fed into the VCF (to turn the rectangle off the PW control has to be set fully CCW)
- external CV input for VCO frequency (1V/octave)
- external CV input for external PWM of the rectangle
- internal CV input for frequency (1V/octave) connected to the CV1 output of the built-in USB/Midi interface
- because of the pure analog circuit and the temperature control it may take up to 30 minutes until the VCO is in tune.

VCF
- 12dB multimode filter with lowpass, notch, highpass and bandpass   mode control for continuous transition from lowpass via notch to highpass and along to bandpass
- manual frequency control
- tracking switch half - off - full (internally connected to the external frequency CV input of the VCO, i.e. the VCF tracks to the VCO if the switch is set to "half" or "full" position)
- exponential frequency modulation control (XFM) with modulation source switch (LFO2 / off / ADSR), the XFM control has polarizer function, i.e. the modulation source (LFO2 or ADSR) selected by the Source switch may affect

the filter frequency in a positive (right half of the control range) or negative way (left half of the control range)
- manual resonance control (up to self oscillation)
- external audio input (this signal is added to the VCO signal)
- external CV input for filter frequency
- 1V/octave tracking for usage of the VCF as a sine wave oscillator over a few octaves (not as precise as the VCO and not temperature compensated, but much better than most of the other filters)

VCA
- manual amplitude control (initial gain)
- AM (amplitude modulation) control with modulation source switch (LFO1 / off / ADSR)
- external CV input for VCA amplitude
- exponential scale.

LFO1 and LFO2
- manual frequency control
- waveform switch (triangle / off / rectangle)
- range switch (low, audio, medium)
- LED display (dual green/red color for positive/negative share of the signal)
- the LFO1 signal is available as an additional socket (to use the LFO1 signal for external modules)

ADSR
- manual controls for Attack, Decay, Sustain, Release
- range switch (long, short, medium)
- blue LED display
- ADSR signal is available as an additional socket (to use the ADSR signal for external modules)
- External Gate input (normalled via switching contact of the socket to the Gate output of the built-in USB/Midi interface)

USB/Midi-Interface
- Midi channel and reference note are adjusted by means of a learn button and LED at the rear panel
- The interface generates the gate signal that controls the envelope generator and three analog control voltages: CV1 is used to control the pitch of the VCO, CV2 the VCF frequency (free assignable Midi controller) and CV3 is

available as an additional socket at the rear panel (controlled by volume/velocity). It can be patched e.g. to the VCA control input.

- The three CVs and the gate signal are also available at the rear panel as jack sockets
- In/Outputs (all monophonic 3.5 mm jack sockets, except USB, Midi and power supply)
- power supply (12...15V AC, min. 400mA)

Additional remarks and specs:

- As the LFO frequencies can go up to moderate audio range (~ 5kHz) even audio FM effects of VCO (pitch and pulsewidth), VCF and ADSR are possible !
- If the VCO is turned off and the VCF resonance is set to maximum the module can be used as a sine oscillator. The sine can be modulated in a linear manner from the triangle wave of the VCO and by LFO2 in an exponential manner at the same time !
- Weight: about 1.2 kg (without power supply)
- Distance between the knobs (center - center): ~ 25 mm, diameter of the knobs: ~ 16 mm
- The metal case is made of 1 mm steel, black coated with white printing
- Overall dimensions: about 185 x 145 x 75 mm

- Dimension of the metal case only (without side plates and knobs): about 145 x 135 x 55
- Side plates dimensions: about 145 x 65 x 12.5 mm   The wooden side plates can be removed if desired. They are mounted by means of two screws to the metal box. The holes in the metal box can be used also to mount several devices together (e.g. with common wooden side plates on both ends).
- The device can be positioned horizontal (desk top) or vertical
- These parts are included: power supply (12 AC/min. 800mA) for 230V mains voltage with European mains plug, one adapter cable 3.5 mm - 6.3 mm /1/4" jack plug (1.5 m length), one USB cable (type A-B, 2 m length) and two A-100 patch cables (50 cm length)
- Powering the device via USB is not possible, because the analog circuits require a dual voltage (+/-12V).
- A lot of additional functions are available as internal pin headers (e.g. VCO outputs, linear FM input for VCO, hard SYNC input for VCO, VCF outputs, LFO outputs, LFO connections for optional reset/direction features, ADSR outout, inverter input and output).

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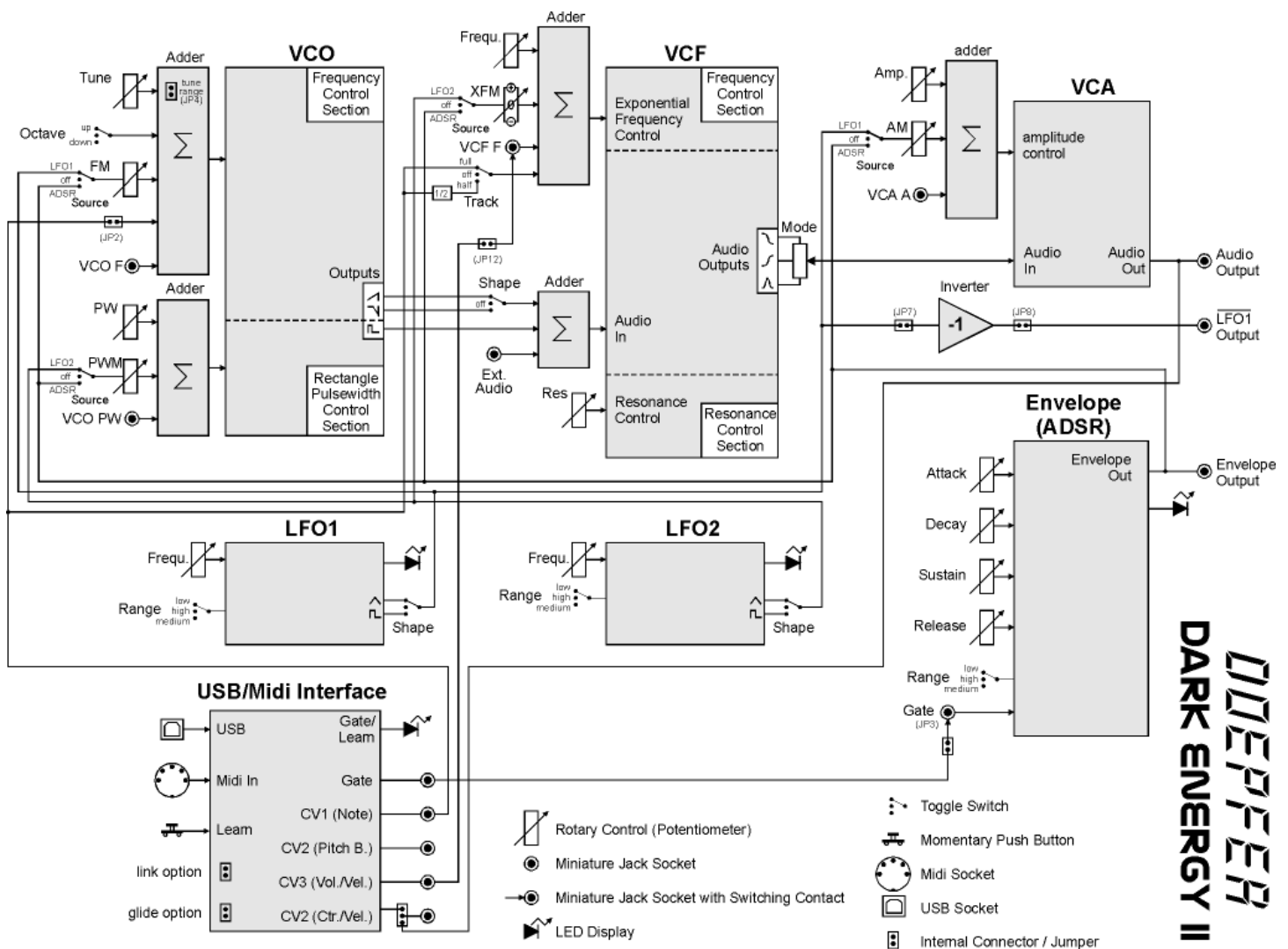
DARK TIME

2 x 8 Analog Sequencer with USB and Midi

Dark Time is an 2 x8 steps analog sequencer with CV/Gate, USB and Midi interface. It is planned in the first place as an add-on for the Dark Energy but may be used even in combination with other Midi, USB or CV/Gate equipment too. Here is a list of the most important Features:

- two rows with 8 controls each
- for each step:
  - one rotary control (same knob type as Dark Energy)
  - one three-position toggle switch: On/Off/Skip:
    - On = trigger signal is active for this step
    - Off = no trigger output for this step
    - Skip = step is skipped
  - one three-position toggle switch: Stop/Continue/Jump:
    - Stop = sequence stops here
    - Continue = sequence continues
    - Jump/Reset: if only one of the switches is in the *Jump* position a Reset is carried out (jump to stage 1), if two or more of the switches are in the *Jump* position the sequence jumps to the next step with the switch in the *Jump* position and then continues from this position (until another step with the switch in the *Jump* position is reached and then the same procedure is carried out again)
- several operating modes:
  - 1x16 (the two rows are daisy-chained)
  - 2x8 (both rows run in parallel)
  - Custom (user defined mode, e.g. three times row 1 and the once row 2, *not yet available in the first firmware version !*)
- several running directions
  - forward
  - backward
  - random
- three voltage / tuning ranges: 1V, 2V, 5V (corresponding to 1/2/5 octaves)
- quantization on/off/custom scale (*custom scale not yet available in the first firmware version)* when quantization is "off" the resolution is still 10 bit (i.e. 1024 steps over the full rotating range of each potentiometer), from this the term "quantization off" is not fully correct, with quantization "on" the resolution is 13/25/61 steps for 1/2/5 octaves

- transpose via switch (-1/0/+1 octave), Midi/USB or external CV input
- timing control, selected by a three position switch:
  - internal via built-in clock oscillator with frequency and pulsewidth controls
  - external via Midi/USB
  - external via analog clock/start/stop
- analog interface for CV/gate/clock/Start-Stop (inputs and outputs, 3.5 mm miniature jack sockets)
- Midi interface (in and out)
- USB interface (Midi via USB)
- basic parameters are set in the configuration mode (e.g. Midi channels for row 1 and 2, Midi clock dividing factor, custom scale, custom running mode)
- optically adapted to Dark Energy (same knobs, same depth and height, same wooden side plates and so on)
- firmware update via USB and PC
- Powered via external power supply (12 AC/min. 400mA), powering the device via USB is not possible

Additional remarks and specs:

- distance between knobs (center - center): 25 mm
- diameter of the knobs: ~ 16 mm
- distance between switches (center - center): 12.5 mm
- distance between knobs and switches (center - center): ~ 20 mm
- The metal case is made of 1 mm steel, black coated with white printing
- overall dimensions: about 248 x 145 x 75 mm
- dimension of the metal case only (without side plates and knobs): about 223 x 135 x 55 mm
- side plates dimensions: about 145 x 65 x 12.5 mm (same as Dark Energy)
- Weight: about 1.5 kg (without power supply)
- The device can be positioned horizontal (desk top) or vertical
- These parts are included: power supply (12V AC/min. 400mA) for 230V mains voltage with European mains plug, one USB cable (type A-B, 2 m length) and four A-100 patch cables (two 50 cm length and two 80 cm length)

R2M

MIDI RIBBON/ TRAUTONIUM CONTROLLER

R2M is a **ribbon controller** that generates control signals by moving the finger on the ribbon manual. The output signals are generated as **Midi** and **CV/Gate** control voltages simultaneously. Consequently R2M allows to control both Midi and CV/Gate based equipment (e.g. analog synthesizers or analog modular systems). R2M is the abbreviation for Ribbon to (2) MIDI.

R2M is made of two parts: the **manual** and the **control box**. For the manual the same type as the for the modular version A-198 is used. It includes a 50 cm position sensor and a pressure sensor. The control box converts the data coming from the manual (finger position and pressure) into the corresponding Midi data resp. CV/Gate voltages. The control box is available even without manual to make use of an already existing A-198 manual and take advantage of the additional features of the **R2M** control unit compared to the comparatively simple A-198. These are the most important **R2M** features:

1. Manual

- precise and sensitive **position sensor** (length 50 cm) that responds even to light finger touch
- **pressure sensor** located below the position sensor
- solid metal frame (double U-shape profile), silver-grey color
- several M3 threads on all sides (e.g. to mount the manual on a base or to mount several manuals together or ...)
- measures: ~ 600 mm length x 30 mm width x 18 mm height
- weight: about 900 g
- connection to the control box via 4-pin cable (same as used for USB connections but no USB function), 1m cable included

2. Control Box

- receives the analog resistance data coming from the position and pressure sensor of the manual and converts these information into Midi date resp. CV/Gate voltages
- operation via 10 buttons, 6 blue LEDs and illuminated 2 x 16 character LCD
- these MIDI messages can be assigned to the two sensors:
- note on/off without pitch bend
- note on/off with pitch bend
- pitch bend, after touch, any control change number
- program change
- "Trautonium" mode: in this special mode only a single note on message is generated when the position sensor is touched. After that only pitch bend messages are generated until the finger is lifted off. Attention! This mode requires that the MIDI receiver offers a sufficient pitch bend range (5 octave for max. R2M use) and resolution so that no steps are heard over the complete range. For details about the **Trautonium** please look at our web site.

- complete range. For details about the **Trautonium** please look at our web site.
- Adjustable pitch bend width to adjust the R2M pitch bend to the receiver's pitch bend
- 12 bit pitch bend resolution
- MIDI channel, control change number and pitch scale can be adjusted
- quantization option, i.e. only certain notes resp. control voltages (e.g. only major or minor notes) are generated. For details please refer to the A-100 quantizer module A-156 as the quantization of the R2M is very similar.
- adjustable manual scaling (i.e. which length of the manual corresponds to one octave, full length is max. 5 octaves)
- inverse scaling is possible (important if e.g. the manual is put on with a strap)
- MIDI output
- resolution of the analog manual data: 12 Bit
- simultaneous output of MIDI data and CV/Gate voltages
- 2 CV outputs:
- CV1 outputs the position sensor data (1V/octave standard, 0...max. +5V, i.e. max. 5 octaves)
- CV2 outputs the pressure sensor data (0...+5V)
- Gate output (corresponds to CV1)
- Gate can be configured as voltage gate (0/+5V) or switched trigger (jumper inside the box)
- adjustable gate polarity:
- normal: 0 -> +5V when the sensor is touched
- inverse: +5V -> 0V when the sensor is touched
- CV output resolution: 12 Bit
- all settings (e.g. scaling, quantization, arpeggio and so on) affect both MIDI and CV/Gate outputs
- CV hold and active Gate are possible at the same time (was not possible for the A-198)
- no CV drift in hold mode (A-198 has a small CV drift in hold mode)
- 16 user defined presets (i.e. non volatile memory for 16 complete settings of the unit)
- solid, silvergrey metal case (desktop shape)
- measures: about 128 width x 91 depth x 26 height (front) resp. 42 height (rear, because of desktop shape, measures in mm)
- weight: about 400g
- external power supply (7-12V DC / min. 250mA required)
- same manual as A-198 (if you already own an A-198 only the R2M control box is required)
- from middle of 2011 the case color is changed to **black** (for both the manual and the control box)

MAQ16/3 MIDI Analog Sequencer

special edition with black front panel and Dark Energy/ Time knobs

Designed in Cooperation with the German Band KRAFTWERK

Fans of vintage analog sequencers will be glad of the MAQ16/3. It combines the creative potential of an analog sequencer with the advantages of MIDI. MAQ16/3 outputs the sequencing data both as control voltages (CV) and as MIDI data. MIDI Out of the MAQ may be connected to MIDI In of any sound generating MIDI device (synthesizer, sampler) or to a computer sequencer recording the MAQ data. Additionally 3 control voltage and gate outputs are available for controlling vintage synthesizer equipment (e.g. the A-100 Analog Modular System). The main feature of the MAQ is the real time access to the sequence via 48 rotary potentiometers grouped in 3 rows of 16 dials each. All important parameters like first/last step, MIDI event, MIDI channel, forward/backward/random/pendulum mode, gate time, tempo and so on are independently assigned to each row and can be changed in real time while the sequence is running. This enables very complex sequences. The rows may not only be used for generating note events but also other MIDI events or for controlling the length of time for each step. Of course the MAQ allows the synchronisation via MIDI Clock, Start and Stop either as master or as slave.

- MIDI Sequencer featuring analog inputs
- 3 rows of 16 knobs and LEDs (red or blue) each
- Grey 19-inch rack-mount unit (4 U)
- Assignable MIDI-Events and MIDI-Channels for the 3 rows:
  - Note On/Off
  - Velocity
  - Controller (0...127), Pitchbend, Aftertouch mono and poly
  - Program Change (for dynamic sound change)
  - MIDI channel of another row (for dynamic sound change)
  - Transposition of another row
  - Gate time (length of time for this column)
- First/last step of each row adjustable
- MIDI channel of each row selectable
- Available modes for each row: Forward/Backwards/Pendulum/ Random
- Different timings for each row (synchronized by MIDI clock)
- Transposition via incoming note on events possible
- Muting of single steps and complete row possible (also via incoming Program change or note events)
- External Synchronisation (via MIDI Start/Stop/Clock In) or
- Internal Synchronisation (MAQ transmits MIDI Start/Stop/Clock Out)
- 32 Sequence memories (Presets) in non-volatile memory
- Full editing capabilty of all preset parameters
- Remote control of important parameters (first/last step, mode, event type, mute step, mute row and so on) via program change and Note events (no Sy-Ex necessary)
- 3-digit, 7-segment display
- Operation via 8 buttons with LEDs
- Rotary encoder for rapid input of all parameters
- 3 CV and Gate outputs (3.5 mm jack sockets on rear panel)
- Dimensions: 480 x 177 x 110 mm (19" /4 HU)
- Weight: about 3 kg
- External 115...230V power supply with europlug mains connector is included
- For other mains connector types or other mains voltages the power supply has to be purchased by the customer in his country (9...12V DC, 500mA required)

MCV4   MIDI to CV/Gate Interface

MCV4 is a low-cost interface to control vintage monophonic synthesizers via MIDI:

- 4 analog control voltages CV1...CV4, voltage range 0...+5V, 8 bit resolution
- CV1 = pitch control (VCO), 1V/octave, controlled by MIDI note on/off and pitch bend (1/4 semitone resolution)
- CV2...4 = voltage control of other functions (e.g. VCF frequency, volume) controlled by monophic after touch (CV2), velocity/volume (CV3) and selectable MIDI controller (CV4)
- 3 gate output types selectable via jumper inside the device: voltage trigger (+5V or power supply voltage) or S-trigger
- MIDI channel and reference note for CV1 = 0V adjustable via learn button
- Different assign modes for CV1 (highest note, last note, reference note)
- Retrigger on/off while playing legato
- Gate/trigger polarity normal/inverse
- Two 1/4" stereo jack sockets for CV1/2 and CV3/4 (cable 1/4" stereo -> 2x1/4" mono required, not included, pls. order in addition)
- 1/4" mono jack socket for gate/trigger

- Learn button with LED for adjusting MIDI channel, reference note for CV1, controller for CV4 and other parameters
- Optical display of gate/trigger via LED
- MIDI-In, MIDI-Thru
- Non-volatile memory for parameter settings
- Metal case, approx. 95x75x35 mm
- External power supply 9...12V/100mA
- Adapter for 230V AC with Europlug mains connector is available, adapters for other voltages or other mains connector types have to be purchased by the customer in his country

MSY2   MIDI to Sync/Clock Interface

MSY2 is an interface to control vintage drum computers or sequencers that use the SYNC standard (e.g. Roland TR808 rhythm composer, TB303 bass line). MSY2 converts the MIDI realtime events Clock, Start and Stop into the corresponding signals Clock and Start/Stop of the Sync standard. Sync Clock is a periodic signal (0/+5V) representing the tempo. Sync Start/Stop is a signal that indicates one of the 2 possible states: Start = +5V, Stop = 0V.

- 2 SYNC DIN sockets (switched in parallel)
- Clock miniature jack socket 3.5mm e.g. to control the arpeggiator of a synthesizer
- LED display of Clock and Start/Stop
- MIDI-In, MIDI-Thru
- Clock conversation rate between MIDI clock and Sync clock adjustable via DIP switch in the range of 1...16 (clock dividing factor)

- Start/Stop polarity and Clock polarity adjustable via DIP switches (for applications not following the SYNC standard)
- Metal case, approx. 65x60x40 mm
- External power supply 9...12V/100mA
- Adapter for 230V AC with Europlug connector is available, adapters for other voltages or mains connector types have to be purchased by the customer in his country

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DARK LINK

MIDI/USB to CV/Gate Interface

Dark Link is a Midi/USB-to-CV/Gate interface to control vintage monophonic synthesizers via Midi or USB. **Dark Link** is nothing but the USB/Midi interface of the Dark Energy. It has available 4 analog control voltage outputs (CV1...4) and one Gate output.

In/Outputs and controls*:*

- USB
- Midi Input
- Learn button
- Gate Out (with LED for Gate display and learn function)
- Internal jumper that is used to set the gate voltage to +5V or +12V, if the jumper is removed the gate output has S-Trigger function.
- CV1: controlled by Midi note messages, 1V/Octave, 0...+5V
- CV2: controlled by Midi pitch bend, ~ -2.5...+2.5V or ~ 0...+5V (can be selected by an internal jumper)
- CV3: controlled by Midi velocity, 0...+5V
- CV4: controlled by Midi control change messages, free assignable controller in learn mode
- Glide control (portamento function for CV1)
- power supply (12V AC/min. 400mA)
- CV1...CV4 and Gate are 3.5 mm miniature jack sockets

Other Features:

- Midi channel, reference note and Midi control change number for CV4 are adjusted by means of a learn button and LED
- Metal case, made of 1 mm steel, black coated with white printing
- Dimensions: about 145 length x 35 height x 60 depth (all measures are in mm)
- These parts are included (worldwide): one USB cable (type A-B), user's guide
- These parts are included (only within Europe): power supply (12 AC/min. 400mA) for 230V mains voltage with European mains plug, please ask the Doepfer representative in your country if a power supply is included if you from other countries
- Please order suitable patch cables in addition if required (Midi, A-100 patch cable in the required length, adapter cable 3.5 mm - 6.3 mm /1/4" jack plug)
- Powering the device via USB is not possible, because the analog circuits require a dual voltage (+/- 12V).