



DOMINION X SED

Operating Manual

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Note: We have included schematic views of the described sections for better understanding. All names of controls, switches and jacks are printed bold and are exactly spelled as labeled on the unit.

GENERAL

DOMINION X SED is a monophonic analogue synthesizer. It offers all the benefits and quality of former and current MFB-synthesizers. In addition, it adds advanced circuits, extended functions and a new designed enclosure. This way, DOMINION X SED offers even more versatile sounds and useful features for live-performances.

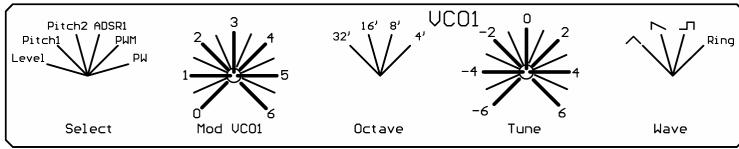
Among its most important characteristics are a threefold oscillator section, a new designed multimode filter with two separate filter circuits, 128 memory locations, MIDI and CV/Gate-control plus additional control inputs to connect analogue sequencers and modular synthesizer systems.

SETUP

DOMINION X SED is powered by the included 12 volts power supply. Connect the power supply to the unit's rear panel **POWER** input. Make sure to connect DOMINION X SED's **AUDIO OUT** to a mixing console, an audio-interface or an amplifier before switching on. Press **ON/OFF** to switch DOMINION X SED on and off.

The synthesizer is controlled by MIDI or its CV/Gate inputs. Connect the **MIDI IN** input to the MIDI-output of a keyboard or a computer MIDI-interface. Alternatively, use inputs **CV VCO1** (as well as **VCO2** and **VCO3**) and **GATE** to connect an analogue sequencer or an analogue CV/Gate keyboard.

Note: DOMINION X SED uses analogue circuits. It is therefore recommended to "warm up" the unit for 5 to 10 minutes to ensure solid tuning.



OSCILLATORS

All oscillators in DOMINION X SED are voltage controlled (VCO) with equal functions. Differences are found for the **Tune/Interval** controls and for ring modulation. All described functions are valid likewise for **VCO1**, **VCO2** and **VCO3**.

Use the four-stage selector **Wave** to choose the waveform. Available choices are triangle, saw tooth, square and ring modulation. When set to **Ring**, the oscillators ring-modulate each other as follows:

VCO1 – VCO1 <> VCO2

VCO2 – VCO2 <> VCO3

VCO3 – VCO3 <> VCO2

Tune for **VCO1** sets the general tuning of all three oscillators. The available range is approx. ± 6 semi tones.

VCO2 and **VCO3**'s **Interval** controls set the tuning for the respective oscillators. The range is approx. ± 13 semi tones, allowing to detune by little more than a full additional octave.

Use the four-stage selector **Octave** to adjust the octave range for each oscillator. Select between **32'**, **16'**, **8'**, **4'**.

Each VCO can individually be modulated. **Mod VCO** adjusts the respective modulation intensity whereas the modulation target depends on the setting of the **Select** control.

The six-stage selector **Select** allows choosing a specific modulation path for the corresponding oscillator.

Available are:

Level – pre-mixer level modulation by **LFO1**

Pitch1 – pitch modulation by **LFO1**

Pitch2 – pitch modulation by **LFO2**

ADSR1 – pitch modulation by first envelope (**ADSR1**)

PWM – modulation of waveform symmetry by **LFO1**

PW – manual modulation of waveform symmetry by **Mod VCO** control

Explanation

The VCO's waveform symmetry can be modulated periodically by **LFO1** using the **PWM** function. Manual modulation is possible with the selector set to **PW**. The waveforms by using **Mod VCO** change as follows (fully left to fully right):

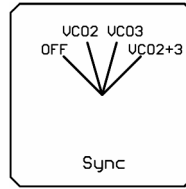
Triangle – triangle to sine wave

Saw Tooth – saw tooth to triangle wave

Square – variable pulse width between 50-95% (center: approx. 75%)

OSCILLATOR-SYNC

All three oscillators can be hard-synced. Here, the main oscillator will dictate its pitch to the synced partner. I.e. whenever the main oscillator changes phase (zero pass), the synced oscillator is forced to do the same. By changing the client oscillator's pitch using **Interval** or by modulation, the spectrum will drastically change.



The best settings for typical sync-sounds are **Pitch1/2** and **ADSR1** selected for the modulation path (using **Select**). In DOMINION X SED, **VCO1** always acts as main-oscillator. However, an external **Sync** signal can also be used. Use the four-stage selector **Sync** to set the synchronized target.

OFF – no synchronization

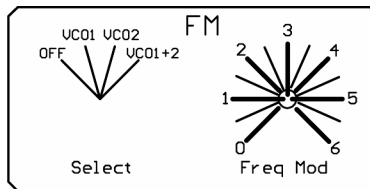
VCO2 – will be synchronized to **VCO1**

VCO3 – will be synchronized to **VCO1**

VCO2+3 – will both be synchronized to **VCO1**

OSCILLATOR-FM

VCO1 and **VCO2** can be modulated in pitch by **VCO3**. Depending on the setting and frequency-ratio, this results in metallic and atonal sounds. Use the four-stage selector **FM** to choose the modulation target.



OFF – no frequency modulation

VCO1 – will be modulated by **VCO3**

VCO2 – will be modulated by **VCO3**

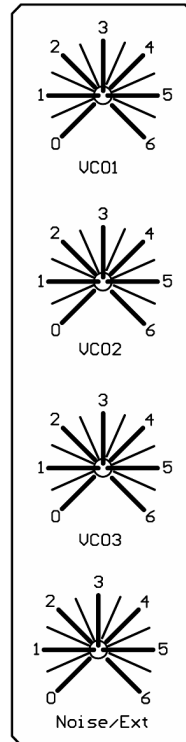
VCO1+2 – will both be modulated by **VCO3**

Freq Mod sets the amount/intensity of the frequency modulation.

MIXER

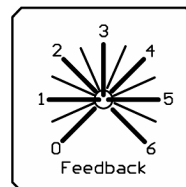
Controls **VCO1**, **VCO2** and **VCO3** set the oscillators' output level, prior entering the filter stage. With all controls set to full level, the filter input will be slightly overdriven.

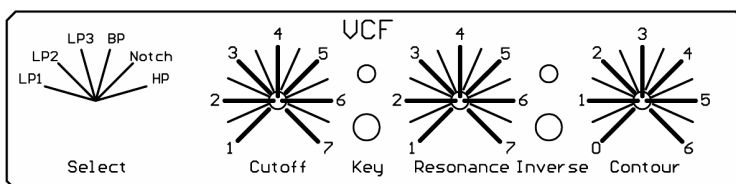
Noise/Ext adjusts the level of the internal noise generator (white noise). The input labeled **Mixer** will overrule the noise generator and replace its signal with the audio signal fed in here. The corresponding control will then set the level for the external audio signal.



FEEDBACK

The **Feedback** control will adjust the amount of signal that is fed from the audio output back into the filter's input. This feedback path leads to distortion and will also influence the different filter types' resonance behavior.





FILTER

DOMINON X SED offers two filter circuits. One being the well-known MFB multimode filter with 12db/oct. slope, characterized by low distortion and constant resonance behavior. The other circuit is the SED filter with 12- and 24dB low pass modes. This filter has a nonlinear resonance and is more sensitive to overdrive. Note that the filters' cutoff frequencies are slightly shifted against each other. Use **Select** to choose between filter modes:

LP1 – 24dB/oct. low pass filter SED

LP2 – 12dB/oct. low pass filter SED

LP3 – 12dB/oct. low pass filter

BP – 12dB/oct. band pass filter (2 x 6dB/oct.)

Notch – 12dB/oct. band reject filter (2 x 6dB/oct.)

HP – 12dB/oct. high pass filter

The filter's cutoff frequency is set using the **Cutoff** control. **Resonance** adjusts the filter's resonance which can reach self-oscillation in all modes. Pressing **Key** will activate the key-follow-function where the cutoff frequency will follow the played notes:

LED off – key-follow amount 0%,

LED lit slightly– key-follow set to 50%,

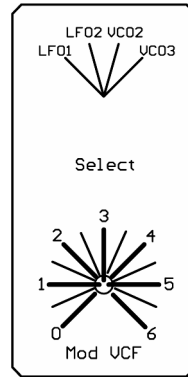
LED fully lit– key-follow amount 100%

The **Contour** control sets the modulations intensity of envelope 1 towards the cutoff frequency. Press **Inverse** to apply negative modulation. The LED is lit in this mode.

FILTER-MODULATION

In addition to the manual control of the cutoff frequency using the **Cutoff** control and envelope 1 modulation, other sources may also be used for modulation.

Use the four-stage selector **Select** to set the modulation source for **Cutoff**. Available sources are **LFO1**, **LFO2**, **VCO2** or **VCO3**. The **Mod VCF** control sets the amount of modulation.

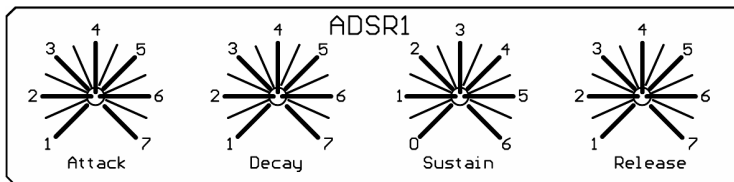


ENVELOPES

DOMINION X SED offers two ADSR-envelopes. Envelope **ADSR1** is permanently connected to control the filter's cutoff frequency with its modulation intensity being controlled by the **Contour** knob. In addition, this envelope can also be used to modulate one or several oscillators by setting the VCO > **Select** switch to the respective position.

Envelope **ADSR2** is exclusively dedicated to the VCA and therefore controls the output volume.

Note: The envelopes' speed can be switched between a normal and slower mode that reduces times by a factor of four (see page 14).

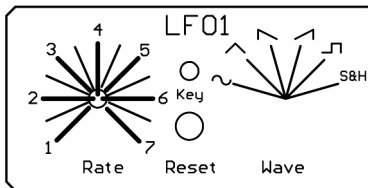


LFOs

LFO1 and **LFO2** offer equal functions. The **Rate** control sets the speed within a range of approx. 0.1Hz to 100Hz.

Use the six-stage selector

Wave to choose the modulation waveform. Available are sine, triangle, descending saw tooth, ascending saw tooth, square as well as sample & hold.



Press **Reset** to determine whether the LFO-waveform is restarted with every incoming MIDI-note:

LED off – free running LFO

LED green – the LFO waveform cycle starts with each incoming MIDI-note

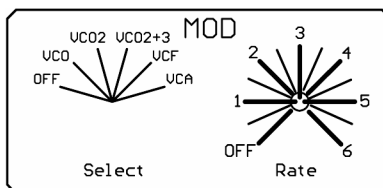
LED red – free running LFO, the speed depends upon incoming MIDI-notes (higher notes > higher LFO speed)

LED green/red – the LFO waveform cycle starts with every incoming MIDI-note, the speed also depends upon incoming MIDI-notes (higher notes > higher LFO speed)

Both LFOs can be switched in their global speeds as well as between normal cyclic and one-shot modes (see page 14/LFO and page 16/Reset).

MOD-LFO

The **MOD-LFO** utilizes a triangle waveform and works in dependence of a keyboard's modulation wheel respectively MIDI controller CC#1. The higher the modulation wheel's output value, the higher the modulation intensity.



Use the six-stage selector **Select** to set the modulation target:

VCO – pitch of all three oscillators

VCO2 – pitch of **VCO2** (e.g. for sync)

VCO2+3 – pitch of both **VCO2** and **VCO3**

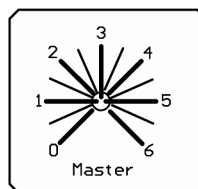
VCF – filter cutoff frequency

VCA – output volume

The **Rate** control sets the LFO speed. When set to **OFF** position, there will be no LFO modulation. Here, the modulation wheel will be used to manually control the targeted parameter. Note, that in this case, the last LFO value will define the modulation maximum. This value may also be negative, resulting in an inverse modulation.

MASTER

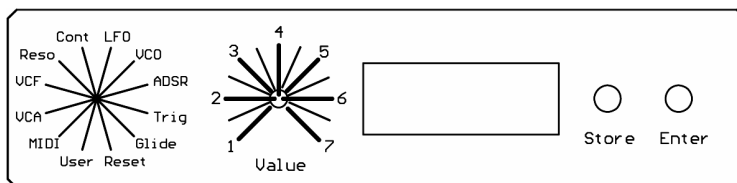
The **Master** control sets the overall output level.



PROGRAMMING

DOMINION X SED's programming section serves several duties. The selector allows choosing the system settings as well as a routing of MIDI velocity data to up to seven simultaneous targets.

The **Value** control sets the respective modulation intensities and is also used to specify parameter values.



VELOCITY-ROUTING

The keyboard's velocity can be routed to up to seven target parameters. These are selected with the selector's positions **VCA** to **ADSR**. Each target parameter can be modulated with individual intensity. With a value of **00** displayed, no modulation is carried out. All other values are added or subtracted (for negative values) to the current positions of the targeted parameters. All settings are stored with the preset.

VCA – addresses the output level (**-63** to **63**)

VCF – addresses the filter's cutoff frequency (**-63** to **63**)

Reso – addresses the filter's resonance (**-63** to **63**)

Cont – addresses the modulation intensity of **Contour**, i.e. the filter's modulation by **ADSR1** (**-15** to **15**)

LFO – addresses the LFOs' speed (**-63** to **63**).

Toggle between the two LFOs by pressing **Enter**. With the left display dot lit, velocity data are routed to **LFO1**, with the center display dot lit; velocity data are routed to **LFO2**.

This menu allows switching both LFOs between normal speed and a slower mode (by factor 4). Press **Enter** until the right display dot is lights up. Now, use **Value** switch between **FSt** (fast) and **SLo** (slow). The setting is valid for both LFOs.

VCO – modulates the VCO-waveforms' symmetry (**Mod VCO > PM**) (**-63** to **63**).

Toggle between the three VCOs by pressing **Enter**. With the left display dot lit, **VCO1** is selected, the center display has **VCO2** selected, the right display dot **VCO3**.

ADSR – modulates Attack, Decay and Release of the envelopes (**- IS** to **IS**).

Toggle between the two envelopes by pressing **Enter**. With the left display dot lit, **ADSR1** is selected; with the center display lit **ADSR2** is selected. Note that this modulation works inverted. Higher values shorten the envelope times.

This menu allows switching both envelopes between normal speed and a slower mode (by factor 4). Press **Enter** until the right display dot is lights up. Now, use **Value** switch between **FSt** (fast) and **SLo** (slow). The setting is valid for both envelopes.

Note: In combination with a filter-modulation, you may imitate an accent function, comparable to the one found in Roland's TB-303.

SYSTEM SETTINGS

The additional selector positions in the program section are dedicated to define system settings and to perform preset selections. Use the **Value** control to enter the parameter values and confirm your entries by pressing **Enter**.

User – selecting presets

DOMINION X SED offers four banks A, b, C, d with 32 memory locations each, named **AO 1** to **d32**. Switching between banks is possible by selecting **Ann**, **bnn**, **Cnn** or **dnn**, available at the very end of the **Value** control's range. Press **Enter** to confirm your entry - all three display dots will be lit.

Select the desired preset 01 to 32 within this bank next, using the **Value** control. Confirm your selection and load the preset by pressing **Enter**.

Turning the **Value** control fully left, **Pot** will be displayed. Here, the sound represents the current settings of the unit. When loading a preset, the controls' positions do not match with the parameters' stored values. Therefore, edits will only be noticeable when changing the controls significantly.

User – saving presets

Press **Store** to save an edited sound. The right display dot will light up. In case you want to store the sound to another memory location, select the desired bank and location as described earlier. Press **Store** twice (center and left display dots will light up) to complete the procedure.

MIDI – this function (left display dot lit) serves to define the MIDI-channel (1 to 16). To change the MIDI-channel, select a new channel using the **Value** control. The new channel is immediately active and need no confirmation.

Trig – this function selects the trigger-behavior for notes played legato. When set to **ON**, retriggering is active. This means that legato played notes will always trigger the envelopes whenever a key is pressed. When set to **OFF**, retriggering is inactive. Here, legato played notes will not trigger the envelopes.

Glide – this function offers three subcategories that can be switched by pressing **Enter**. The parameters are selected using the **Value** control. The actual glide-time is set with the dedicated **Glide** control.

Glide type (left display dot lit)

t-C – time-constant, i.e. the glide-time is constant and independent of the played interval

i-C – the glide-time depends upon the played interval. The larger the interval, the longer the glide-time.

Glide mode (center display dot lit)

Std – the glide-effect is triggered with every played note

LEG – the glide-effect is only triggered with notes played legato.

Glide curve (right display dot lit)

The display is meant to visualize the glide-characteristic:

first setting – logarithmic

second setting – linear

third setting – exponential

Reset – this function switches the LFOs' behavior.

Press **Enter** to select between **LFO1** (left display dot lit) and **LFO2** (center display dot lit).

ONE – single cycle pass of the waveform (One Shot)

CON – cyclic repeating waveform repetition

CALIBRATING THE VCF

The key follow and resonance functions can be calibrated to match tonality. The values displayed are in hexadecimal. Due of the tolerances immanent to analogue systems, it is best to adjust this value using your ear.

Starting from the **VCF** menu, press **Enter** continuously, until the center display dot (key follow) or the right display dot is lit (resonance). Use **Value** to adjust the parameters.

DEMO-SEQUENCES

It is possible to use the sound engine of DOMINION X SED without an attached keyboard or sequencer. This is useful in case of a sound check or when creating new presets. There are four internal demo-sequences to work with.

DEMO – START/STOP

To start a demo-sequence, press and hold **Enter** in combination with one of the following four buttons: **VCF Key**, **VCF Inverse**, **LFO1 Reset**, **LFO2 Reset**. Each of the buttons will call up an individual sequence. Pressing **Enter** in combination with any of the three other buttons while the sequence is running, will start the new sequence from 1 immediately. Sequence 4 will just open the VCA and is meant to use the filter input without using the VCOs.

Pressing **Enter** in combination with the active sequence's button while running, will stop the demo-sequence.

DEMO – SPEED AND TRANSPOSITION

A demo-sequence's tempo can only be adjusting while the sequence is running. Press and hold **Enter** and use **Value** to adjust the tempo within a range of **60** and **120** (no BPM). The demo-sequences can be transposed using MIDI note data.

MIDI-DUMP

DOMINION X SED's 128 presets can be sent out using the MIDI dump function for archiving purposes, e.g. in a DAW. Choose between transmitting the full memory or any of the four preset banks A to D (page 15).

From the **MIDI** menu, press **Enter** continuously until the right display dot is lit. Now, use **Value** to select between **ALL**, **Ann**, **bnn**, **Cnn** or **dnn**. Press **Store** to start the dump process.

To reload MIDI dump data into DOMINION X SED, simply play back the dump file. DOMINION X SED will automatically switch to receive the data.

PROGRAM CHANGES

DOMINION X SED sends and receives MIDI program change commands, except when set to **Pat**. Whenever a preset in DOMINION X SED is selected and loaded by pressing **Enter**, the corresponding program change command is sent to the MIDI output. This happens in regard to the internal preset banks. Presets **AD 1** to **A32** correspond to the identical program change number. Preset **b0 1** equals program change 033, preset **C0 1** equals program change 065 and so on.

Program change commands received by DOMINION X SED will automatically call up the corresponding preset. Unlike a manual load of a preset, there is no need to press **Enter**.

SYSEX-ID

Set DOMINION X SED's SYSEX-ID from the MIDI menu. Press **Enter** continuously until the center display dot is lit. Now, use **Value** to adjust the ID.

CONNECTIONS

REAR-PANEL

Power – plug the included 12 volts power supply in here

Note: Pressing **ON/OFF** does not switch the power supply of. This switch simply interrupts the power connection to DOMINION X SED.

MIDI IN / MIDI OUT / MIDI THRU – use these three jacks to connect your MIDI-peripherals.

INSERT – this TRS-jacks allows insertion of an effects-unit in DOMINION X SED's signal path, using a Y-cable.

AUDIO OUT – this jack carries the monophonic output signal

TOP-PANEL

The top-panel-connections allow controlling DOMINION X SED by using analogue CV- and gate voltages. Adequate control units are step-sequencers like MFB's URZWERG PRO or MEGAZWERG for functional expansion. In addition, DOMINION X SED is also compatible to all common Euro rack module synthesizer systems.

CV VCO1 / CV VCO2 / CV VCO3 – these inputs allow control over all three VCOs using CV-voltages conforming to the 1V/oct. standard. With only one input connected, the signal will be distributed to the following VCOs. By this, connecting a single CV to input **VCO1** allows control over all three oscillators' pitches simultaneously.

GATE – apply a 5 volts gate-signal here to trigger both envelopes. With the **Reset** and/or the one-shot-function being active for one or both LFOs, this signal will also trigger these functions.

FM VCO – an external signal applied to this input will replace **VCO3** as the source of frequency modulation. The settings for **Select** and **Freq Mod** will remain valid. Inserting a cable here will interrupt the internal FM-connection.

SYNC – an external signal applied to this input will replace **VCO1** as the sync-source. The setting for the **Sync** selector will remain valid. Inserting a cable here will interrupt the internal sync-connection.

MIXER – this input allows feeding an external audio signal into the signal path, replacing the noise generator in the mixer stage. Use **Noise/Ext** to adjust the external signal's level. Inserting a cable here will disable the internal noise generator.

CV VCF – this CV-input allows modulation of the filter frequency with a voltage ranging from 0 to 5 volts. This modulation is added to the existing modulation signals of the envelope and LFO.

CV VCA – this CV-input addresses the VCA, using a range of 0 to 5 volts.