Antonus 2600 duophonic MIDI-CV interface

User Manual

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ANTONUS

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Special thanks to Guido Salaya for his help and work in this development.
It has been a pleasure to work together between Barcelona and Buenos Aires
despite the distances and the circumstances of the year 2020.

More about Guido and his work at front of GS Music at:

www.gsmusic.com.ar

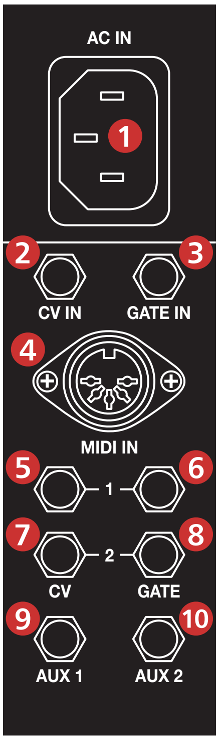
https://www.facebook.com/GSMusicArg

Antonus 2600 duophonic MIDI-CV interface

The Antonus model 2600 has a built in MIDI / CV interface that allows a simple and direct communication with a big number of electronic musical instruments. Add MIDI to the Antonus 2600 was done with the original ARP 2600 keyboard connector in mind, which allowed in a simple and clean way to connect the tunings of all VCO's, the VCF tracking and GATE and TRIGGER signals using internal buses. This allows classic configurations without need for additional wiring on the front panel.

The first keyboard to make use of this internal bus was the ARP 3604. The duophonic interface of the Antonus 2600 was developed thinking about the features of the later keyboard model, the ARP 3620, which among other functions allowed to articulate two different voltages at the same time to be able to achieve the effect of two simultaneous pitches using the control voltage 1 (lower in classic ARP) to control one oscillator and voltage control 2 (upper) for a second oscillator. At this manual we can see later more examples of monophonic and duophonic modes.

Panel description

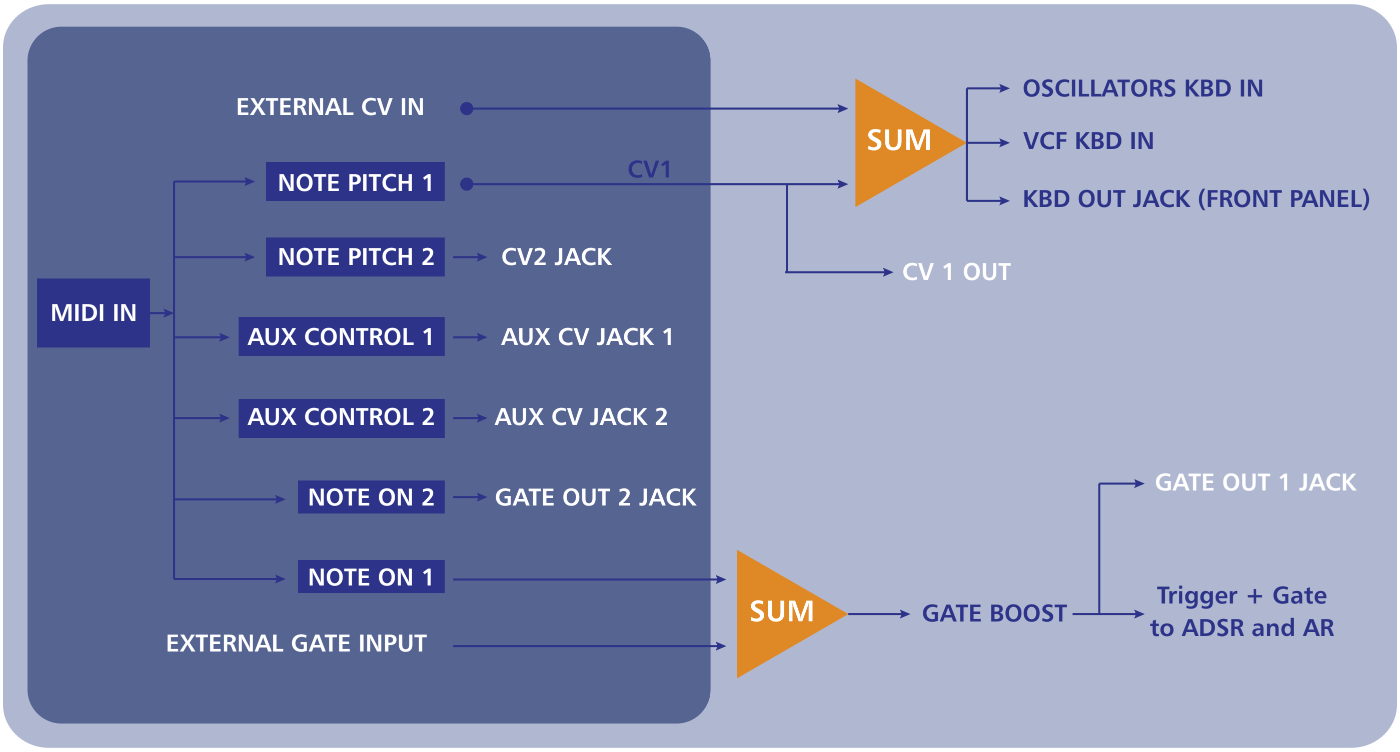


1. IEC C13 AC power input.
2. Control Voltage input normalled to internal KBD CV BUS.
3. GATE input normalled and converted to internal TRIGGER+GATE then connected to ADSR and AR internal bus.
4. MIDI input.
5. Pitch voltage control output signal for voice 1 (non transposed by external CV IN).
6. Gate signal output, voice 1 or monophonic modes.
7. Pitch voltage control output signal for voice 2 (when jack is plugged).
8. Gate signal output for voice 2, when jack is plugged at CV2 output (7).
9. Auxiliary CV1 output.
10. Auxiliary CV2 output.

Voltaje inputs

The interface features two inputs for play the 2600 using control voltage signals. The CV IN (2) input refers to the voltage control input whose destination will be the KBD CV bus. The standard is volt/octave and accepts any voltage between +10 and -10 volts. The GATE IN (3) is the input to trigg the ADSR and AR envelopes. Using this input we ensure full compatibility of a wide range of different GATE signals from different levels and manufacturers always that they follow the protocol of GATE active = positive voltage and GATE OFF at 0v. This task is done thanks to the internal circuit (Gateboost) described earlier in this manual.

If this special GATE IN (3) input is not used, it is not possible to guarantee the correct operation of any trigger signal using the front panel input to trigger the envelopes. Only external 10v gate signals can activate properly the envelopes using the front panel trigger input, so for more compatibility use the GATE IN socket of this interface.



Signal diagram

Another reason for use this GATE INPUT for have a proper envelope trigger is that GATE signal conversion is required as the ADSR needs two signals, TRIGGER and GATE for work properly. This conversion is done electronically on the same interface using internal circuitry. Specifically, the TRIGGER signal (short trigger) is responsible for starting in the envelope ADSR the Attack stage and the GATE signal is controlling the rest of stages.

The TRIGGER and GATE signals generated from MIDI are present at the front jack sockets of the 2600 near to the envelope trigger selector. Highlight that the same connections also works as input (that is, they are bi-directional) of TRIGGER and GATE signals that can come from any classic ARP keyboard that follows this trigger standard. The GATE output signal (boosted) is present at connector number 4 on the interface panel.

Like GATE signals generated via MIDI message, all GATE signals through this input will be added to the 2600's internal GATE bus (summed).

The GATE OUT 1 (6) output on the interface and the GATE and TRIGGER outputs on the front panel will generate a signal whether it receives a signal from MIDI or from the GATE IN input (3). Arranging these elements in this way allows that in addition to a classic use one can quickly and efficiently use those resources in non-standard ways, for example using the CV to play in tune the oscillators but use for any other function the signal of GATE generated on each MIDI note, you make a dissasociation from the original "NOTE ON" concept (pitch and trigger at same time).

Also in this way you can use the MIDI interface not only to control the 2600 but also to control any other synthesizer that uses the volt per octave and positive GATE norms using the front panel KBD CV outputs and the side panel GATE OUT output. Used by this way we obtain an independent MIDI to CV converter of the 2600 itself. Also the GATE and Trigger front connections are bidirectional, they can be used to control classic ARP equipment or that those classic gear controls the Antonus 2600.

MIDI interface

The Antonus 2600's MIDI interface consists of a MIDI digital signal input using a standard DIN-5 connector. This interface interprets the digital messages it receives at its input and is responsible for converting to voltage signals (volts per octave) necessary to interact with the 2600. The range of the voltage ouput is from -5v to +5v, is is a total of

10 octaves. The user can modify this range of notes using MIDI SYSEX commands for set the 0v reference, taking into account that there is a margin of 5 negative volts and another of 5 positive volts. (+/- 5 octaves). It is very important say that the signal present in CV IN (2) will be summed to the signal that is generated via MIDI, making possible typical uses such as transposing sequences when for example using a MIDI sequencer to generate sequences and a voltage signal from a voltage control keyboard to transpose the sequence, or vice versa with CV sequencer and MIDI notes as transposer. We can use the signal resulting from CV IN summed with MIDI CV1 using the front panel KBD OUT.

If, on the other hand, we are interested in using only the MIDI CV 1 signal not affected by the CV IN signal, in that case we will use the CV1 (5) output of the interface panel. In the same way, the GATE signals will be summed when both GATE signals and MIDI note are working at same time.

The pitch bend wheel also works with the CV signal in a range of +/- 2 semitones from the center point of the wheel. In turn, the interface interprets the signals of note on / off to generate a positive GATE voltage signal for ON message and 0v for OFF message.

The AUX CV outputs (9 and 10) provide a voltage signal that corresponds to the value of a MIDI control (by default velocity in AUX1 and CC 74 in AUX2) where 0 volts is the lowest value and 5 volts the highest value. The default configuration of this MIDI interface can be changed at the time of ordering your 2600 by direct order from Antonus, or sending SYSEX system exclusive MIDI messages at any moment. The full list of parameters will be detailed later.

Operating modes

Monophonic:

In this mode, MIDI conversion generates a single voltage control signal that is normalled on the internal KBD CV bus, so it controls the VCOs and VCFs without additional connections. As it is monophonic, the number of simultaneous notes received by MIDI doesn’t matter, only one note is played and its priority is the standard last note pressed (last note priority). In this mode, the CV2 and GATE2 outputs are not used.

Duophonic:

This mode becomes active automatically when a patch cable is connected to the CV2 output (7). At that precise moment the interface will be ready to receive polyphonic information via MIDI and will manage the outputs of CV 1 and 2 according to the lowest note (CV1) and the highest note (CV2). If it is the case of playing a chord of 3 notes or more, it must be taken into account that the notes between the lowest and the highest will be ignored.

If only one note is pressed in this mode, CV1 and CV2 will be the same, CV2 will copy the CV1. Only if more than one note is active at the same time, CV2 will start to emit the CV signal corresponding to the highest note and CV1 will emit the signal corresponding to the lowest note. The same way occurs at the outputs of GATE 1 and 2.

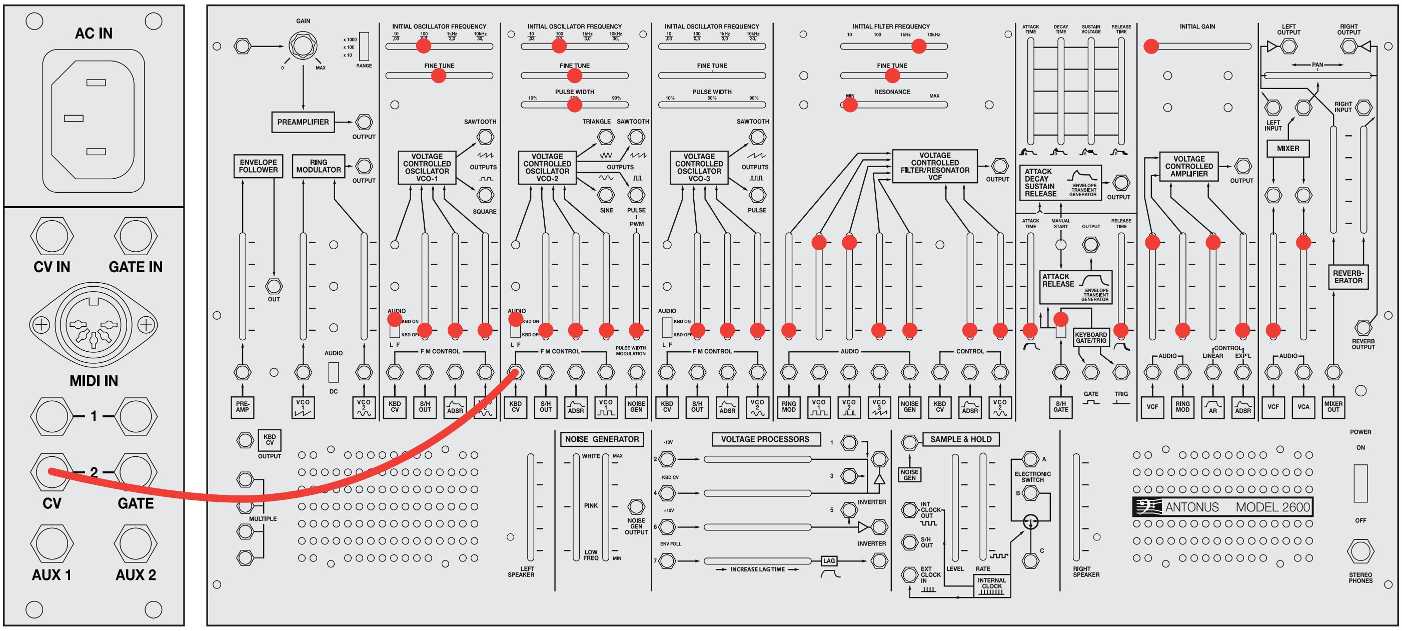
It should be remembered that CV1 is internally normalized to the KBD CV bus that controls the VCO and VCF as well as GATE1 is on the internal bus that controls the triggering of the envelopes (as long as the front panel switch that chooses the triggering of the envelopes of the 2600 is in the upper position).

This means that to play two voices in the 2600 it will be necessary to use the cable from CV2 socket and connect to the volt per octave control input of the oscillator that we want to use for that purpose, (this input is marked in each oscillator as KBD CV). This input must be used to produce correct interruption of the normalized signal from the CV1 at the KBD bus and replace with the CV2 pitch signal. If this KBD CV input is not used, then we can’t play in tune volt/octave so for standard tunning is not suitable. Of course if you want to experiment with another scales this can be a way.

It should be noted that every time more than two notes are used at the same time in this duophonic mode, a signal of +5 volts will be emitted at the GATE 2 output. In this way we can associate additional trigger events in the condition of two or more notes pressed at same time.

Duophonic examples:

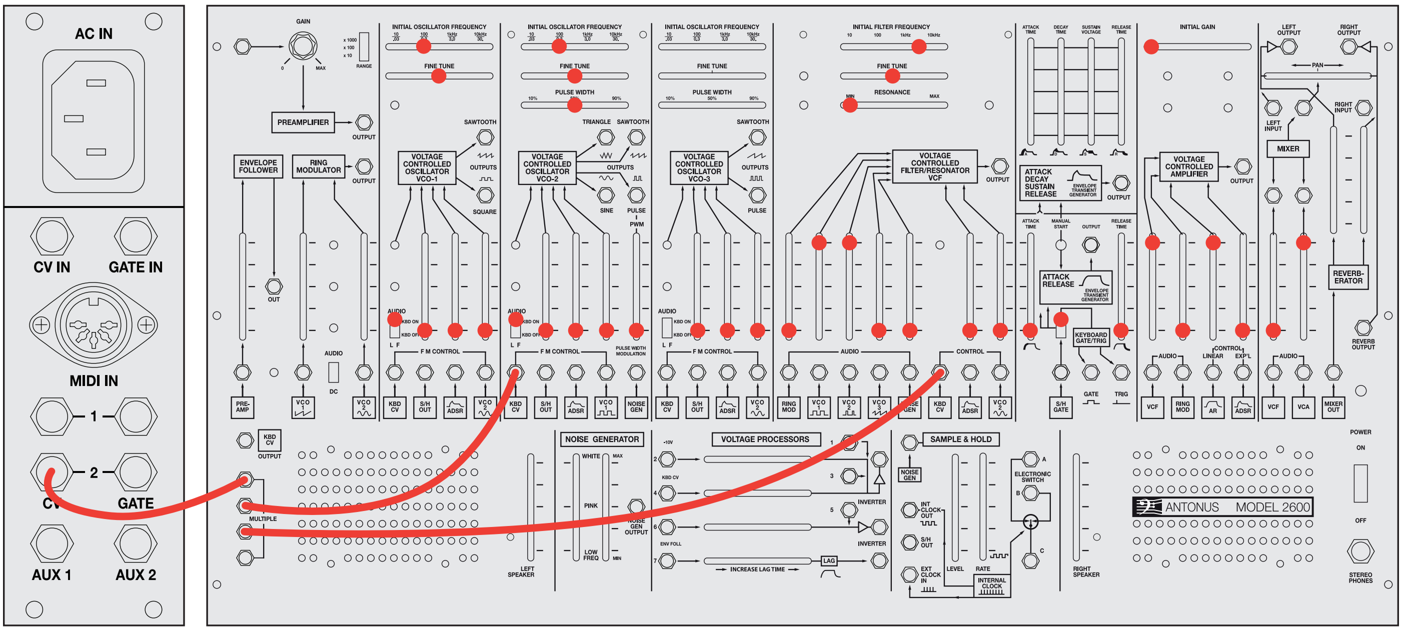
Example 1:


AC IN
CV IN
GATE IN
MIDI IN
1
2
CV
GATE
AUX 1
AUX 2
PREAMPLIFIER
ENVELOPE FOLLOWER
RING MODULATOR
VOLTAGE CONTROLLED OSCILLATOR VCO-1
VOLTAGE CONTROLLED OSCILLATOR VCO-2
VOLTAGE CONTROLLED OSCILLATOR VCO-3
VOLTAGE CONTROLLED FILTER/RESONATOR VCF
ATTACK DECAY SUSTAIN RELEASE
ATTACK RELEASE
VOLTAGE CONTROLLED AMPLIFIER
MIXER
REVERB-ERATOR
NOISE GENERATOR
VOLTAGE PROCESSORS
SAMPLE & HOLD
MULTIPLE
ANTONUS MODEL 2600

Example of a duophonic patch, two oscillators tuned in unison. Oscillator 2 maintains the same pitch as Oscillator 1. Only when there are two or more notes pressed the Oscillator 2 switch to the highest note.

It should be noted that using this duophonic mode (patch cable at the CV2 socket) but using only CV1 or CV2 to control all oscillators we will obtain a monophonic behavior of lower priority using CV1 or higher note using CV2. In this way we can use the Antonus 2600 in three total monophonic modes, depending on the priority (lowest, highest, or last note priority). The following example uses the function to use the highest note priority for control the brightness at the filter.

Example 2:


AC IN
CV IN
GATE IN
MIDI IN
1
2
CV
GATE
AUX 1
AUX 2
PREAMPLIFIER
ENVELOPE FOLLOWER
RING MODULATOR
VOLTAGE CONTROLLED OSCILLATOR VCO-1
VOLTAGE CONTROLLED OSCILLATOR VCO-2
VOLTAGE CONTROLLED OSCILLATOR VCO-3
VOLTAGE CONTROLLED FILTER/RESONATOR VCF
ATTACK DECAY SUSTAIN RELEASE
ATTACK RELEASE
VOLTAGE CONTROLLED AMPLIFIER
MIXER
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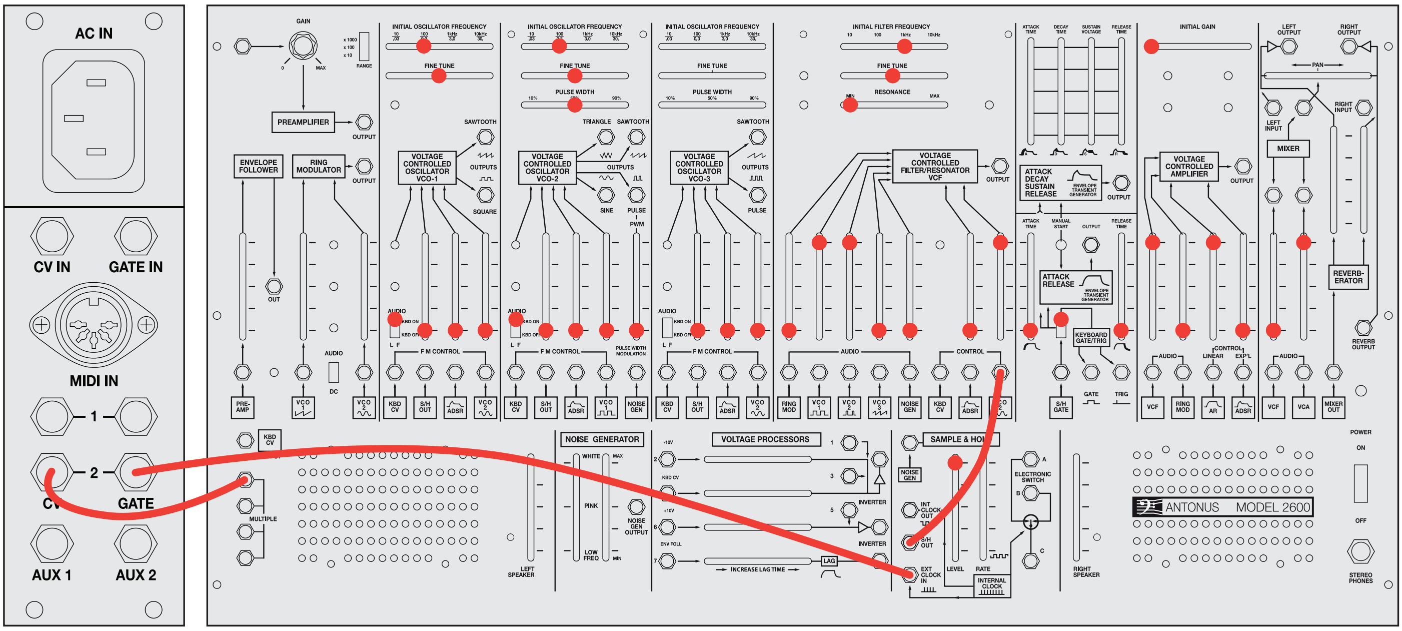
Example like the 1 except that the filter’s keyboard tracking follows the highest note, this is to prevent the top note from being “darked “when the filter tends to be closed in reference to oscillator 1.

In duophonic mode (when there is a patch at CV2) it means that GATE emits high signal every time there is more than one note active at same time. When we want to use a monophonic patch but use the GATE 2 as an additional trigger, we can use a blind connector (dummy patch) or a direct cable to the multiple without connecting anything else there, or leave a cable with one end in the air. The idea is to activate the duophonic mode but not to use that CV2, what we will use will be the GATE 2 as an additional trigger signal conditioned to the pressing of 2 or more notes.

Example 3:



In this example we will use the GATE2 signal to activate the sample and hold that sends a random signal to the filter cutoff. In this way, while we play one note at a time, the filter is only controlled by the keyboard control by default, but at the moment that two or more notes are pressed the filter changes the cutoff from a random voltage value as long as the condition of pressed notes is maintained. Every time the condition changes, the sample and hold will update and send a new random voltage to the filter so that we can define while playing the moments we send a new value to the filter cutoff. 1 note = static value, 2 or more notes = change value.

Performance features

Pitch Bend wheel:

As previously stated the pitch bend wheel messages affect the pitch CV signal in a range of +/- 2 semitones from the center point of the wheel at its default value.

This range can be reduced or extended by using CC 33 which can be changed from the value 0 equivalent to effect disabled to the value 127 equivalent to a pitch bend range of ± one octave.

Interval Latch:

The Interval Latch function is exclusive to the duophonic mode. It consists of memorizing the interval that corresponds between CV1 and CV2. This interval relation can be played in a monophonic way. By default the function is assigned to the CC 66 control which usually corresponds to the SOSTENUTO pedal. Off values are between 0 and 63, and active between 64 and 127. In this way we can play melodic passages with duophony and at any time press the pedal to capture the interval ratio which can be for example a fifth with respect to the lowest note. While the pedal is pressed, we can play a monophonic melody but with a relation of fifths between the VCOs. To unify both tones again we will only have to release the pedal. Again if we play another interval like for example one octave of difference and we press the pedal then we can play oscillators octaved, like if using an octave switch selector.

This function is also useful when we are playing a duophonic passage, right at the moment of releasing the notes, the interval relationship that existed in the last two notes is maintained during the release stage of the envelope controlled by the VCA, avoiding hearing the "return to CV1" effect at the CV2, when all keys are released.

Remember that the duophonic mode separates CV2 from CV1 when two or more keys are pressed but the moment in which one or no more keys are pressed then CV2 copies CV1 again, so with the interval Latch we can keep two simultaneuos notes fading naturally after they are played. Important note that in order to keep the effect during the release stage, the last note released must be the lower one, since releasing the highest note at the last moment will result in a transpose pitch jump of course following the logic of operation.

It should be remembered that the range for converted midi notes to CV is between -5v and + 5v. This means that if we make use of the interval latch function and the corresponding CV2 would have to give as result of a transposition a voltage higher than + 5v then will not give a voltage higher than 5v. Instead that, the voltage will be limited to the maximum possible value by the digital / analog converter.

Note hold:

This function make to keep note active independently of the note ON messages. It is very useful to keep an active note without the need to stay physically playing the keyboard note or whatever controller we use. The translation of this function from the MIDI domain to the voltage domain means that the GATE output signals will be always high regardless of whether there are active notes or not. By default this parameter responds to CC 64, the control usually used for the MIDI sustain pedal. If the control is between 0 and 63 it will be deactivated, and between 62 and 127 will be on. This parameter works at same way in monophonic and duophonic mode.

Portamento:

This function reproduces the effect of make the pitch transition between two consecutive notes in continous slide effect instead jumping the pitch. The function is activated using the CC65, (usually associated with the portamento pedal) with the OFF state for values between 0 and 63 and the ON state for values between 64 and 127.

The portamento time is controlled by the CC5, also usually associated with this parameter in most controllers and synthesizers. It should be mentioned that the portamento effect is applied equally for both CV1 and CV2 channels in both monophonic and duophonic modes.

Low Frequency Oscillator (LFO):

This function is more complex than the rest of the functions both by its nature and by the possibilities of uses and destinations. This oscillator produces a periodic waveform selectable between:

1. Triangular
2. Up ramp
3. Down ramp
4. Square
5. Off, continuous value

The different waveforms are selectables by CC 28. The minimum speed is 0.1Hz and the maximum is 100Hz and is controlled by CC 29. This function can be added to any of the control signals by voltage, both the CV 1 and 2 pitch voltage control signals and the auxillary 1 and 2 outputs.

The route and amount for the LFO can be controlled in real time by CC. The LFO is connected to all possible routes and what we actually control is the depth at the destinations using the CCs assigned for it. In this case we are going to show a box where can see LFO destination controls and destinations.

The summary of LFO depth controls would be this:

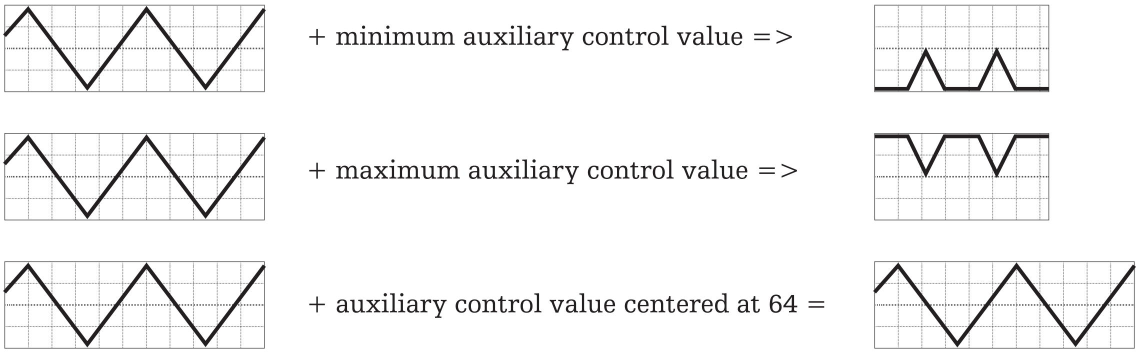
Parameter	CC
LFO initial level at Pitch	19
LFO level by Aftertouch at Pitch	20
LFO level by Modulation Wheel at Pitch	21
LFO initial level at Aux 1	22
LFO level by Aftertouch at Aux1	23
LFO level by Modulation Wheel at Aux1	24
LFO initial level at Aux 2	25
LFO level by Aftertouch at Aux2	26
LFO level by Modulation Wheel at Aux2	27

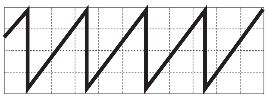
That way with a value of 0 at the parameter is equivalent to deactivated and for any higher value it is equivalent to the maximum value in which the LFO will work for control and specific destination. By default we have assigned a subtle value of Aftertouch controlling LFO by modulating the pitch, and the maximum value of the modulation wheel controlling the same LFO by modulating the pitch, which corresponds to ± one octave of range. To reduce the maximum value of the modulation controlled by the modulation wheel, we have to send a lower value in CC 21. Also to modify the maximum amplitude of LFO at the pitch controlled by the Aftertouch we must use CC 20. CC 19 will define the initial gain of the LFO modulating the pitch. In this way we can always have a defined modulation in a fixed way even with the Aftertouch and mod wheel controls are at 0. This ratio of modulations is produced equally in both CV1 and CV2.

The portamento function can work simultaneously with the LFO function on the tone channel. The auxiliary CV outputs 1 and 2 works in same way, with their respective controlled depth controls by Aftertouch and mod wheel and initial minimum depth.

It should be noted that auxiliary outputs have the signal voltage range is between 0 and 5 volts and that in the case that the sum between the value of the control and the value of the LFO is more then 5v o less than 0 it will produce a clipping of the LFO signal.

An example at the following drawing:


+ minimum auxiliary control value =>
+ maximum auxiliary control value =>
+ auxiliary control value centered at 64 =



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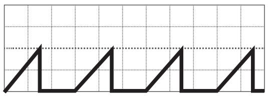

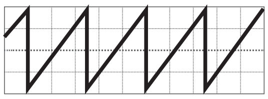

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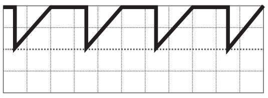

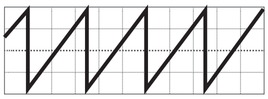

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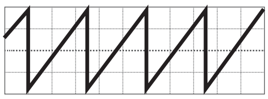

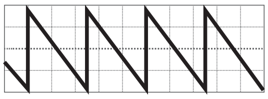

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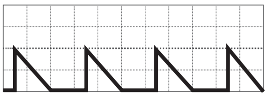

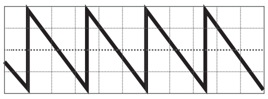

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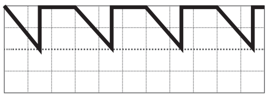

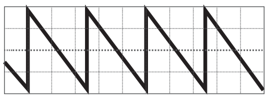

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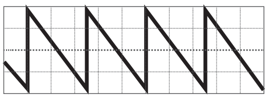

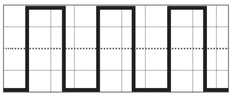

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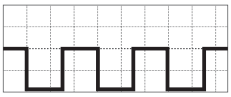

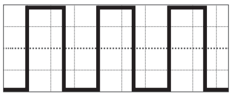

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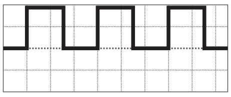
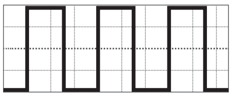
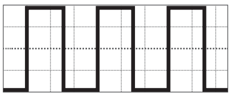




+ auxiliary control value centered at 64 =



With this we can in turn obtain different waveforms by simple clipping. In the case of the square wave, the waveform will not change the shape by changing the value, but the maximum and minimum values will change in function of the offset value added by the CC assigned to the auxiliary.

In the case that we want to use an auxiliary output such as a traditional LFO with a full waveform and stable even at its maximum amplitude value we will have to set a fixed value of MIDI value 64.

By default, if the user has not changed these parameters, Auxiliary 1 responds to velocity control and Auxiliary 2 to control 74. In this case when using a velocity-sensitive controller, you should make sure to disable the function and keep a constant value of 64 to use output 1 as a pure and classic LFO, centered and without clipping waveform. So to keep the dynamic feature of velocity control available and have a LFO with a constant centered value without complications, it would be easier to use auxiliary 2 with the CC 74 of value 64 to use that output as a pure LFO. This is a recommendation taking into account the values by factory default. The user can change the controls of Auxiliary 1 and 2 and choose the channel that he wants to such a function. Of course it is also valid for the creative part to use the LFO together with velocity for different “Sub-waveforms by clipping” based on each velocity value provided by each note that is pressed.

Summary of parameters and their associated controls

Parameter	CC
Aux 1	Velocity
Aux 2	74
Portamento On/Off	65
Portamento Time	5
Note Hold	64
Interval Latch	66
LFO Wave	28
LFO Speed	29
LFO Pitch INT	19
LFO Pitch AT	20
LFO Pitch MW	21
LFO Aux 1 INT	22
LFO Aux 1 AT	23
LFO Aux 1 MW	24
LFO Aux 2 INT	25
LFO Aux 2 AT	26
LFO Aux 2 MW	27
Pitch Bend Range	33

Using SYSEX commands to change settings

The duophonic interface of the Antonus 2600 is designed to allow a wide range of variables without the need for change the internal programming. You can still change the default controls using MIDI system exclusive messages (SYSEX) so that these changes are saved in memory and will remain in memory despite the shutdown of the instrument. To send these messages it is convenient to use a MIDI player that does not filter this type of sysex message or either use a program with a dedicated message editor such as MIDI-OX http://www.midiox.com or Sysex Librarian for MAC.

Word for change channel and select note referred to 0 volts for CV1 and CV2:
F0 00 20 7A 01 <pitchcv> 01 <channel> <event><param> F7
<pitchcv> = 01
<channel> 01-16: assign MIDI channel in hexadecimal from 00 to 0F
<event> 01 fix
<param> (00-7F) selects wich MIDI note is 0v
Example: assign channel 1 and the note 48 for 0v
F0 00 20 7A 01 01 01 00 01 3C F7

NOTE: The defined channel for notes also defines the rest of controls.

Word for change the AUX1 control:
F0 00 20 7A 01 <AUX1> 01 <event> F7

<AUX1> = 02

<event> 03 for CC; 05 for channel aftertouch; 07 for velocity

<param> (00-7F) refered to CC

Example: assign velocity to Aux1

F0 00 20 7A 01 02 01 07 00 F7

Word for change the AUX2 control:

F0 00 20 7A 01 <AUX2> 01 <event> F7

<AUX2> = 03

<event> 03 for CC; 05 for channel aftertouch; 07 for velocity

<param> (00-7F) refered to CC

Example: assign CC74 to Aux2

F0 00 20 7A 01 03 01 03 4A F7

Word for change the controller assigned to Interval Latch:

F0 00 20 7A 01 <Interval Latch> 01 <param> F7

<Interval Latch> = 04

<param> (00-7F) refered to CC

Example: assign pedal (CC66) for activate the Interval Latch

F0 00 20 7A 01 04 01 42 F7

Word for change the controller for Pitch Bend Range:

F0 00 20 7A 01 <Pitch Bend amount> 01 <param>F7

<Pitch Bend amount> = 05

<param> (00-7F) refered to CC

Example: assign controller 33 for Pitch Bend Range

F0 00 20 7A 01 05 01 21 F7

Word for change the controller of the HOLD note function:

F0 00 20 7A 01 <hold> 01 <param>F7

<hold> = 06

<param> (00-7F) refered to CC

Example: assign controller 64 for HOLD

F0 00 20 7A 01 06 01 40 F7

Word for change the CC controlling the LFO WAVEFORM:

F0 00 20 7A 01 <wave> 01 <param>F7

<wave> = 07

<param> (00-7F) refered to CC

Example: assign CC28 for the LFO WAVEFORM selector

F0 00 20 7A 01 07 01 1C F7

Word for change the CC controlling the LFO SPEED:

F0 00 20 7A 01 <speed> 01 <param>F7

<speed> = 08

<param> (00-7F) refered to CC

Example: assign CC29 for LFO SPEED

F0 00 20 7A 01 08 01 1D F7

Word for change the CC controlling LFO pitch initial level:

F0 00 20 7A 01 <total pitch lfo> 01 <param>F7

<total pitch lfo> = 10

<param> (00-7F) r refered to CC

Example: assign CC19 controlling LFO pitch initial level:

F0 00 20 7A 01 0A 01 13 F7

Word for change the CC controlling LFO pitch Aftertouch level:

F0 00 20 7A 01 <at pitch lfo> 01 <param>F7

<at pitch lfo> = 11

<param> (00-7F) refered to CC

Example: assign CC20 controlling LFO pitch Aftertouch level:

F0 00 20 7A 01 0B 01 14 F7

Word for change the CC controlling LFO pitch Modulation Wheel level:

F0 00 20 7A 01 <mw pitch lfo> 01 <param>F7

<mw pitch lfo> = 12

<param> (00-7F) refered to CC

Example: assign controller 21 controlling LFO pitch Modulation Wheel level:

F0 00 20 7A 01 0C 01 15 F7

Word for change the CC controlling LFO AUX1 initial level:

F0 00 20 7A 01 <aux1 lfo> 01 <param>F7

<aux1 lfo> = 13

<param> (00-7F) refered to CC

Example: assign controller 22 controlling LFO AUX1 initial level:

F0 00 20 7A 01 0D 01 16 F7

Word for change the CC controlling LFO AUX1 Aftertouch level:

F0 00 20 7A 01 <at aux1 lfo> 01 <param>F7

<at aux1 lfo> = 14

<param> (00-7F) refered to CC

Example: assign controller 23 controlling LFO AUX1 Aftertouch level:

F0 00 20 7A 01 0E 01 17 F7

Word for change the CC controlling LFO AUX1 Modulation Wheel level:

F0 00 20 7A 01 <mw aux1 lfo> 01 <param>F7

<mw aux1 lfo> = 15

<param> (00-7F) refered to CC

Example: assign controller 24 controlling LFO AUX1 Modulation Wheel level:

F0 00 20 7A 01 0F 01 18 F7

Word for change the CC controlling LFO AUX2 initial level:

F0 00 20 7A 01 <aux2 lfo> 01 <param>F7

<aux2 lfo> = 16

<param> (00-7F) refered to CC

Example: assign controller 25 controlling LFO AUX2 initial level:

F0 00 20 7A 01 10 01 19 F7

Word for change the CC controlling LFO AUX12 Aftertouch level:

F0 00 20 7A 01 <at aux2 lfo> 01 <param>F7

<at aux2 lfo> = 17

<param> (00-7F) refered to CC

Example: assign controller 26 controlling LFO AUX2 Aftertouch level:

F0 00 20 7A 01 11 01 1A F7

Word for change the CC controlling LFO AUX2 Modulation Wheel level:

F0 00 20 7A 01 <MW aux2 lfo> 01 <param>F7

<mw aux2 lfo> = 18

<param> (00-7F) refered to CC

Example: assign controller 27 controlling LFO AUX2 Modulation Wheel level:

F0 00 20 7A 01 12 01 18 F7

Word for change the CC controlling Portamento ON - OFF:

F0 00 20 7A 01 <portamento-on> 01 <param>F7

<portamento-on> 19

<param> (00-7F) refered to CC

Example: assign controller 65 controlling portamento ON - OFF

F0 00 20 7A 01 13 01 41 F7

Word for change the CC controlling Portamento Time:

F0 00 20 7A 01 <portamento time> 01 <param>F7

<portamento time> 20

<param> (00-7F) refered to CC

Example: assign controller 5 controlling Portamento Time

F0 00 20 7A 01 14 01 05 F7

Messages summary for factory defaults:

F0 00 20 7A 01 01 01 00 01 3C F7

F0 00 20 7A 01 02 01 07 00 F7

F0 00 20 7A 01 03 01 03 4A F7

F0 00 20 7A 01 04 01 42 F7

F0 00 20 7A 01 05 01 21 F7

F0 00 20 7A 01 06 01 40 F7

F0 00 20 7A 01 07 01 1C F7

F0 00 20 7A 01 08 01 1D F7

F0 00 20 7A 01 0A 01 13 F7

F0 00 20 7A 01 0B 01 14 F7

F0 00 20 7A 01 0C 01 15 F7

F0 00 20 7A 01 0D 01 16 F7

F0 00 20 7A 01 0E 01 17 F7

F0 00 20 7A 01 0F 01 18 F7

F0 00 20 7A 01 10 01 19 F7

F0 00 20 7A 01 11 01 1A F7

F0 00 20 7A 01 12 01 18 F7

F0 00 20 7A 01 13 01 41 F7

F0 00 20 7A 01 14 01 05 F7

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