# Introduction

The Atmegatron is an 8-bit digital synthesizer. The Odytron Special Edition comes pre-loaded with the Odytron software, which emulates the sounds of a classic analogue synth in an 8-bit environment. It also comes bundled with a programmer cable and 3 overlays, allowing you to change it into completely different synthesizers, including the standard Atmegatron.

The Odytron software is duophonic, which means that it has 2 totally independent oscillators. The 8-bit Atmega328P processor generates the entire audio path.

The main manual covers all aspects of the synth and the standard Atmegatron software. This manual just covers the Odytron software.

The controls of the Atmegatron are divided into 3 areas: the function and value dials, the digital controls (6 knobs along the top) and analogue controls (volume and bass boost knobs).
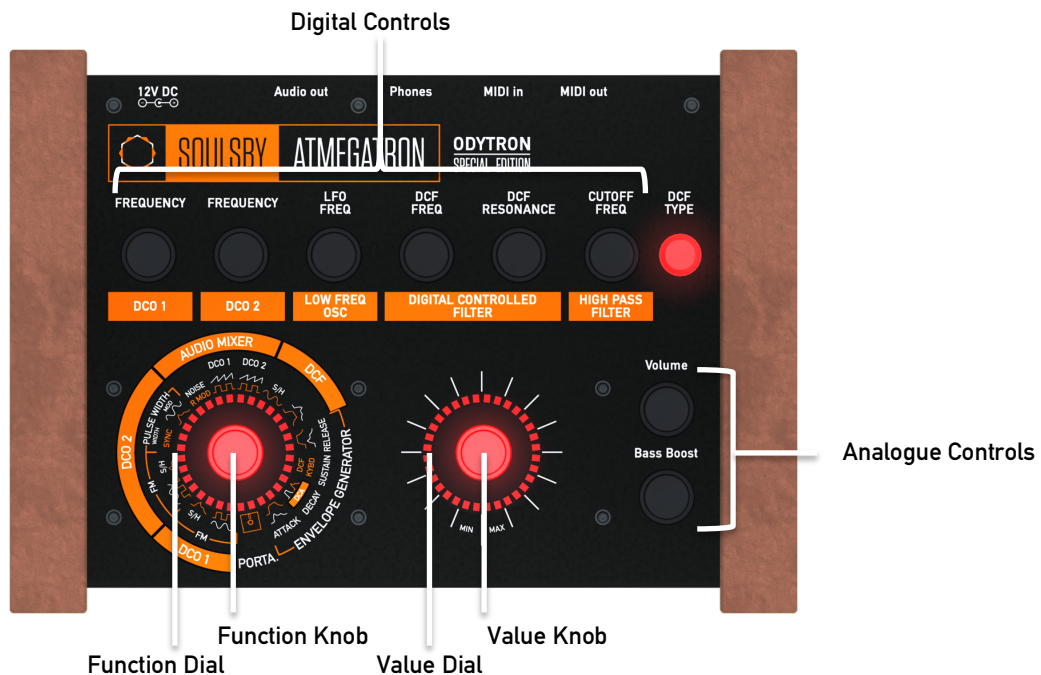
Functions

When the **function knob** is Yellow , it refers to the White legend on the inner circle of the function dial. When it is Red , it refers to the Orange legend.

DCO 1 (Oscillator 1)

FM (Frequency modulation)

The frequency of DCO 1 can be controlled by 2 functions, each with 2 sources. These are sine wave, square wave, sample and hold and ADSR envelope. LFO FREQ controls the rates of the first 3 of these. The ENVELOPE GENERATOR functions control the shape of the ADSR envelope.

Press the **function knob** to toggle between the FM sources on the relevant function.

DCO 2 (Oscillator 2)

FM (Frequency modulation)

This is identical to the FM functions for oscillator 1.

PULSE WIDTH

This adjusts the pulse width of the square wave. It does not affect the sawtooth wave. It will also affect the ring modulator, as this sound source uses the square wave from both oscillators.

Adjust the pulse width with the WIDTH function. Modulate the width using the MOD function. Use the **function knob** to toggle between the modulation sources, which are LFO sine wave and ADSR envelope.

SYNC

Press the **function knob** while the Pulse Width function is selected to toggle wave sync on and off. Wave sync forces the frequency of oscillator 2 to conform to the frequency of oscillator 1 by restarting its waveform cycle at the start of oscillator 1's waveform cycle.

Interesting harmonic sounds can be achieved by modulating the frequency of oscillator 2.

AUDIO MIXER

If all 3 sound sources are set to full volume, they will clip the output before entering the filter.

NOISE / R MOD (Ring modulation)

Use the **function knob** to toggle between white noise and ring modulation sound sources. Use the **value knob** to set the volume of the source.

The ring modulation source takes the outputs of DCO 1 and DCO 2 and creates a waveform that is high when the outputs of the DCOs are different and low when they are the same (known as XOR in Boolean logic). Interesting harmonic effects can be achieved by modulating the frequency of either or both of the DCOs.

DCO 1

Use the **function knob** to toggle between sawtooth and square waves. Use the **value knob** to set the volume of the source.

DCO 2

Use the **function knob** to toggle between sawtooth and square waves. Use the **value knob** to set the volume of the source.

DCF (Low pass filter)

The cutoff frequency of the filter can be controlled by 2 functions, each with 2 sources. These are sample and hold, sine wave, ADSR envelope and AR envelope. LFO FREQ controls the rates of the first 2 of these. The ENVELOPE GENERATOR functions control the shape of the envelopes.

Press the **function knob** to toggle between the control sources on the relevant function.

ENVELOPE GENERATOR

The Odytron has 2 envelopes, 1 ADSR envelope and 1 AR envelope. See the Atmegatron manual for an explanation of the ADSR envelope. The AR envelope is similar to the ADSR, except that it's sustain value is locked at 100% and hence doesn't require a decay value.

ATTACK

Sets the attack time of the envelopes. Press the **function knob** to toggle between controlling the ADSR and AR envelopes.

DECAY

Sets the decay time of the ADSR envelope. Press the **function knob** to toggle between the amplitude of the sound being controlled by either the AR or ADSR envelope.

SUSTAIN

Sets the sustain level of the ADSR envelope. DCF KYBD toggles keyboard tracking of the filter cutoff frequency. When it is on, the cutoff frequency of the filter will be higher when higher notes are played and vice versa.

RELEASE

Sets the release time of the envelopes. Press the `function knob` to toggle between controlling the ADSR and AR envelopes.

PORTAMENTO / SAVE MODE

Use the `value knob` to set the portamento (or glide) time. This is the time to change from one pitch to another.

Press the `function knob` to turn save mode on and off. PLEASE NOTE: the patch load/save procedure is different to all other Atmegatron software versions. When save mode is on, use the `value knob` to select a patch slot to load or save. Then press the `value knob` (NOT the `function knob`) for a short time to load a patch or hold it for at least 2 seconds (until it flashes) to save a patch.

DIGITAL CONTROLS

DCO 1 FREQ

Sets a frequency offset for oscillator 1. This ranges from 0 to -1 octave. Oscillator 1 has lowest note priority.

DCO 2 FREQ

Sets a frequency offset for oscillator 2. This ranges from 0 to +1 octave. Oscillator 2 has highest note priority.

LOW FREQ OSC (LFO) FREQ

Sets the frequency of the low frequency oscillator. This ranges from approximately 0.2 to 20Hz. It is retriggered every time a note is played.

DIGITAL CONTROLLED FILTER (Low pass filter)

DCF FREQ

This sets the cutoff frequency of the low pass filter. Due to constraints of the 8-bit filter algorithms, there are limitations to the range of the cutoff. For a totally unfiltered sound, the DCF TYPE should be set to off.

DCF RESONANCE

This sets the resonance, emphasis or Q of the filter. The red filter is significantly more resonant than the green filter. Due to digital nature of the filter combined with limitations of the 8-bit processor, it is not possible for the filter to self resonate. Using white noise and high resonance values can achieve similar sounds.

HIGH PASS FILTER CUTOFF FREQ

This sets the cutoff frequency of the high pass filter. Use this filter to remove unwanted bass rumble from brighter sounds. Due to the limitations of the 8-bit processor, it is a 1-pole (6dB) filter and has no gain compensation.
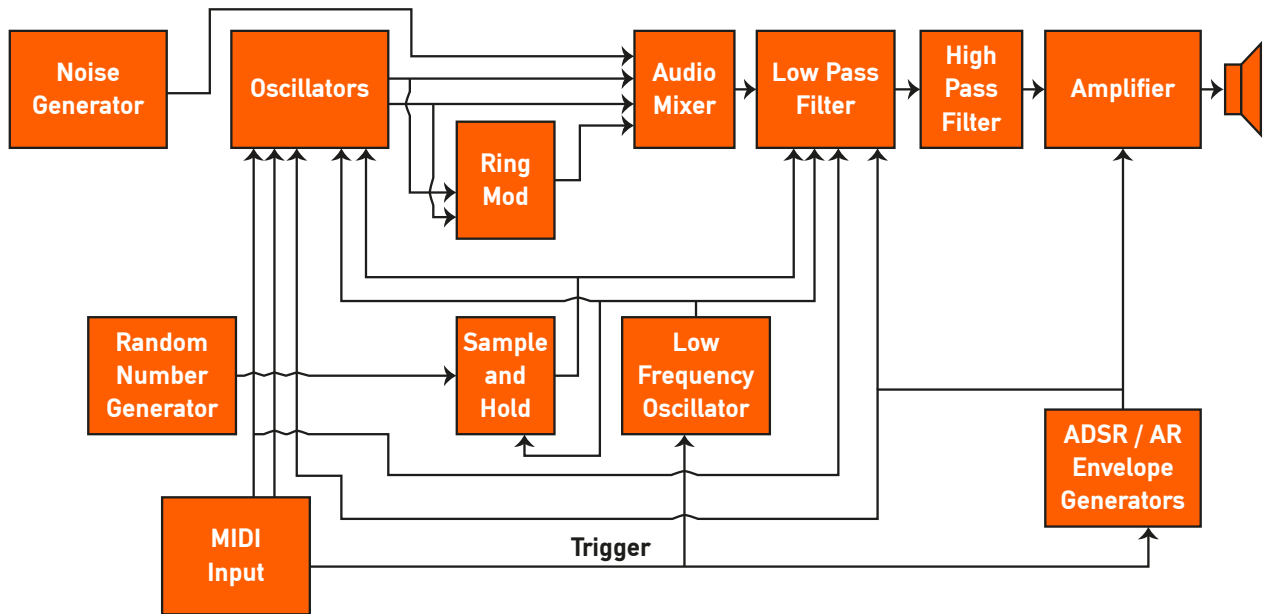
DCF TYPE

The low pass has 2 different algorithms and can be turned off. `Off` = filter off, `Green` = smoother, less resonant, `Red` = harsher, more resonant. Should a filter ever become unstable and the sound start to break up, pressing the DCF TYPE button will reset it.

ANALOGUE CONTROLS

See the main Atmegatron manual for information about these controls.

SYSTEM DIAGRAM

MIDI Implementation Chart

Manufacturer: Soulsby Synthesizers Model: Atmegatron Odytron Special Edition   Version: 1.0   Date: 22/11/15

Functions	Transmitted	Recognised	Remarks
Control Change			
1	X	O	Osc 1 & 2, FM source A
5	X	O	Portamento
71	X	O	Filter resonance
72	X	O	ADSR envelope release
73	X	O	ADSR envelope attack
74	X	O	Filter cutoff
75	X	O	ADST envelope decay
76	X	O	LFO speed
77	X	O	Filter cutoff FM source A
78	X	O	Filter cutoff FM source B
79	X	O	Osc 1 pitch offset
80	X	O	Osc 2 pitch offset
81	X	O	HPF cutoff
82	X	O	Osc 1 FM source B
83	X	O	Osc 2 FM source B
System Real Time			
Clock	X	X	
Commands	X	X	