

**iVCS3** © is the official EMS emulator. You can learn all that you need to know about the **EMS VCS3™** from the original User Manual or from the many resources now online.

## Important Changes Since Ver. 3

This major Version 3 release enables Full Audio Unit Support, see 'Audio Unit Extension' below for more details...

### File Management

In order to accommodate Full Audio Unit Integration, the file management for User Audio and All Preset Banks required a major structural change. The previous '**Documents**' folder has now been replaced by a shared '**App Group**' folder.

Reorganising the file structure in this way allows iVCS3 to access the user files in both it's Audio Unit and Standalone App formats simultaneously and thus any user edits or changes made in one environment are also immediately evident in the other.

**IMPORTANT:** In this new file structure, the shared '**App Group**' folder cannot be accessed by iTunes nor the built-in iOS Files app, but users can access files as usual, using the 'Open In ...', 'Document Picker', 'E-Mail' etc.

### User Interface Navigation

A major update is that the UI Navigation has now been unified for iPhone, iPodTouch, iPad and AUv3. Therefore the matrix tap-zoom was removed in favour of using pinch gestures to zoom-in or zoom-out the entire interface by pinching an empty area (an area of the panel containing no controls). This is valid for both front and rear panels. Users can also double-tap an empty area to fast zoom-in or out, the zoom being centred on the tap coordinates.

An advantage to this full interface zoom is that users can make any parameter much easier to see and use during a performance, for example the Filter Frequency Knob or perhaps the Joystick and Attack Button. This is especially useful on the smaller screen devices.

The scroll view deceleration rate can be set in the app settings.

**Free Update:** '**Under The Dust**' by SINAPSYA, available from the 'Presets & Mod. Shop...'

If you have these Banks installed, please rename or delete before to tap 'Restore Purchases. Thus they will be downloaded again.

## **Audio Unit Extension**

Since iOS 9 Apple introduced the Audio Unit V3 format which enables multiple instances of the same plug-in running at the same time.

Six modules are available in AUv3 format...

VCO, VCF, VCA, NOISE, SPRING, ENV

Full Integration, since v.3

VCS3 (Instr), VCS3 (Fx), VCS3 (MFX)

Users can load these Audio Unit (AUv3) plugins in most common compliant hosts like: apeMatrix, AUM, Audiobus, GarageBand, Cubasis, Auria etc. All of these support host automation, host save/load presets and session.

AUv3 Module MIDI and Audio Implementation is as follows...

VCS3 (Instr) Accepts MIDI Input but not Audio Input.

VCS3 (Fx) No MIDI Input but accepts Audio Input.

VCS3 (MFX) Accepts both MIDI Input and Audio Input.

## **About: James Edward Cosby Preset Bank and Control Files...**

This Library (In-App Purchasing) comprises of over 250 Preset Patches and around 30 Specially Designed Control Files and is the culmination of many hours work extracting the best out of iVCS3, greatly expanding on the app's awesome sonic capabilities...

The Copyrighted Control Files included, enable new almost unlimited Filter/Oscillator etc envelopes, LFO's, Pitch Transients and unbelievable control over any parameter available at the Matrix routed via rows 8 & 9. Once loaded into an Input Channel (1 or 2) the desired Rate can be set and now, thanks to apeSoft, both Inputs 1 & 2's Rate can be Synchronised. The method of Triggering can also be set to either "OFF" in the case of an LFO looping style file or "DK/Seq" to facilitate re-triggering sync to the keyboard or sequencer. The routing takes place via Matrix Pins along rows 8 & 9, and the Amount of modulation is set via the front Panel Input Level Knobs. All normal Input routings are possible including External Mic Mixing via rear Panel (Normally the Inputs should be panned fully right i.e. Mic Off)

## **\*\*\*\*IMPORTANT\*\*\*\***

As the content of the Control Files is NOT ACTUALLY AUDIO it is VITALLY IMPORTANT to SET THE PARAMETER "Samplers Enable Loop Points Fade" to "OFF" in GLOBAL SETTINGS!!! Otherwise a cross-fade could create undesired results when the file loops.

For More Information see [www.JECDesign.com](http://www.JECDesign.com) where there will soon be more Information, tutorials and guides.

### **Important Changes Since Ver. 2**

The major release 2 enables the universal support, it mean that you can run iVCS3 on the iPhone and iPod Touch. The app is 100% compatible with all devices so you can share the Banks/Presets.

Please note, in order to preserve the original iPad layout, the user interface can results very small in the old devices as iPhone 4 and 5.

- 1) New 'James Edward Cosby' In-App purchase Bank, awesome!
- 2) New amazing built-in bank by 'Ray Brunelle'.
- 3) The In-App purchase 'LALA - Sonic Pleasures library' has now been updated. To get the new version, press 'Restore Purchases' under Presets and Mod. Shop.

### **Important Changes Since Ver. 1.6**

In this version we have updated the Samplers (see back panel). This new implementation adds many new interesting features such as Loop Crossfade, Wave Scrubbing, Precise Zoom etc. When you save a new preset, all sampler information (file name, loop-point, start-point) are saved. But since this new update implements our new sampler, the presets saved with the old sampler are no longer available for the loop-points parameter. So we suggest you may need to save again your presets.

Almost all the build-in Preset Banks have been updated, they have more consistent levels & panning now. Users of previous versions can restore the Factory Presets from the Preset Manager to benefit from these new improvements. See the Preset Manager for more details.

Also the In-App purchase 'LALA - Sonic Pleasures library' has now been updated. To get the new version, press 'Restore Purchases' under Presets and Mod. Shop.

## Important Changes Since Ver. 1.1.3

The Ramp wave of VCO 1 has been reversed in polarity, exactly as on the original Putney VCS3.

The Square wave of VCO 2 and VCO 3 has been modified to recreate the offset drift during PWM (Pulse Width Modulation), exactly as on the original Putney VCS3.

The Triangular/Ramp wave of VCO 3 has been redesigned to reproduce better original PWM wave shaping and amplitude, exactly as on the original Putney VCS3.

The changes in VCO, VCA and VCF implementations can affect the resulting sound of some old presets. But only for the CONTROL INPUT MATRIX marked with 'I', 'J', 'K', 'N', 'O' and 'P', do we suggest updating the old presets.

The novel glide parameter was introduced to enhance the sound quality of the VCF and optimize the smoothing of the cutoff frequency control. You can adjust and trim this parameter (Settings) to get the more interesting sound. In particular, the lower the glide threshold, the better is the sound when the VCF is frequency modulated by the oscillators. In other words, when high frequency controlled voltages are applied to the filter, they are low-pass filtered by the C31 capacitor. This means that the filter will not respond to high frequency CVs, and respond slowly to rapid changes in incoming CVs. The knob parameter sets the C31 cap. from the CV input circuit, so the filter will respond to high frequency control.

## Tips & Tricks

- **MAINS Toggle** on/off DSP (Digital Signal Processing). *iVCS3* supports mixed audio with other applications, you can also disable DSP in order to save battery and CPU consumption. You cannot toggle off the Audio Engine when it's connected to Audiobus or Inter-App Audio.
- When the user presses the Home button, the app goes to the background process and will store the whole status of parameters to reload when next opening the app. See Settings for more explanations.
- Double tap on the **Knobs** to show the options. In the **'Edit'** field you can enter the value from the keyboard. Tap **'Random'** to generate a random value, **'Default'** to reset to the factory settings and configure the knobs

dragging behavior. Step fine resolution sets how many points of movement result in a one degree rotation in the knob's position. Only used in the horizontal/vertical slider modes. You can set Knobs behavior from Settings.

- Long Press Tap on the **Toggles** to open Control Manager Assignations.
- Double-tap to Zoom a particular area of the UI.
- Pinch In and Out for manual zooming of the currently displayed area.
- Double Tap in the **Joystick** handle to reset at the central position i.e. zero.
  
- iVCS3 can play audio in the background and/or mix it's own audio with other iOS apps. iVCS3 also supports Apple IAA (i.e. Inter-App Audio for iOS 7 or higher) and Audiobus, so you can send and receive audio through applications.
  
- All Signals connected to the METER in the Matrix will be shown in the Oscilloscope and you can now feedback through to the iVCS3.
  
- Swipe gesture (right to left) on a preset or bank to rename/duplicate/delete it. See Presets for more details.
  
- You can load Presets (current selected bank) by remotely sending a MIDI Program Change message. See MIDI section, below for further details. You can select the MIDI channel where you can receive PC messages. A PC value of zero will select the first preset in the list, a value of 1 for the second etc... The range is from 0 to 127.
  
- We suggest you disable the screen rotation, otherwise the accelerometer doesn't work properly.
  
- Tap over the **Recovery Pins** (Matrix bottom) to change pin color to white green or red. White pins are 2.7K Ohm resistance and green ones are 68K Ohm. For the iVCS3 this translates as: white pins no attenuation, green pins for 0.66, red pins will allow a connection to be adjusted between the normal signal and its inverse. See 'Essential and Recommended EMS Modifications' for more details.
  
- **MIDI Panic** sends a general Message 'All Notes Off', resets the DSP and Keyboard.
  
- **Init** will reset to default values and removes the Matrix Connections and Sequencer Grooves, a reset message will be displayed.

- **Create Random Sound:** opens a window where you can randomly alter the parameter values. The central slider sets the percentage of each random variation, and you can decide whether to include the gain parameters or not with the switch labeled “Include Gains”. A tap on the crossed arrows icon generates a new random configuration. The values can be higher or lower than the preceding values. When the upper or lower limit of a parameter is reached the new values are folded in the opposite direction.

There are two additional icons, two zigzag arrows pointing upward or downward. A tap on the downward arrow generates random values which are lower than the previous ones, a tap on the upward arrow generates random values which are higher than the previous ones. When the upper or lower limit of a parameter is reached the new values are wrapped in the opposite limit.

The curved arrow on the upper left is the global UNDO and resets the parameters to the values they had before the random window was opened.

**Cancel:** closes the Preset Menu with no action.



Show the back panel of *iVCS3* see Back Panel section.



Enable/Disable scrolling and zooming (only VCS3 Full Audio Unit).



This is a shortcut to fast switch to main panel and zoom on the matrix.



Enable/Disable Accelerometer X/Y and LFO, see the Control Manager for more details.



Captures Output stereo signal (post Effects) and creates an audio file *wav* format 44.1 kHz 16 bit in the App Group folder. Files created by *iVCS3* are saved with an id-name followed by a number, for example:

**Output Rec 1.wav, Output Rec 2.wav etc...**

Each new file will be numbered with the next consecutive number.

## SYNC



The goal of SYNC is to setup a global Metronome (MASTER BPM). This will affect the LFO (Low Frequency Oscillator) and/or the Sampler (or Sequencer etc...) when enabled to receive SYNC.

You can set the BPM (Beats Per Minute) by scrolling up/down (or left/right) the label value (♩ 120 ←○→) or tap out the tempo.

Single Tap or Long Tap the minus/plus buttons to increase or decrease by 0.25. By default 120 BPM corresponds to 1 Hz frequency for the LFOs.

### **Ableton Link description**

Ableton Link is a new technology that synchronizes the beat, phase and tempo of Ableton Live and Link-enabled iOS apps over a wireless network. It lets you play devices together with the freedom of a live band. Anyone can start and stop their part while others keep playing, and anyone can adjust the tempo and the rest will follow. You can use Link to play with several copies of Ableton Live, with Live and iOS apps, or with iOS apps together – even without Live in your setup.

### **MIDI Clock description**

The clock signal is broadcasted via MIDI to ensure that several MIDI-enabled devices such as a synthesizer or music sequencer stay in synchronization. The iOS implementation is designed to provide precise, jitter-free MIDI clock transmission and robust, error-tolerant MIDI clock reception.

### **Quantization**

When you are connected to an Ableton Live Session, the Play/Stop/Rewind transport will wait until the next sync quantum boundary before starting. The 'Sync' button waits for the next beat (Tempo Forte) from the MIDI Clock or Ableton Link and resets all phases for LFOs, Sequencer etc.

### **Send MIDI Clock**

Will create a virtual MIDI port for the MIDI Clock Output. In Play/Stop mode the MIDI Start/Stop Clock messages are sent according to Transport Play/Stop (Sampler, Sequencer etc...). In 'Always' they will not be sent every time, but only at start.

Please note when you are connected to Ableton Link, the incoming MIDI Clock is disabled while you can send MIDI Clock out, converting the Ableton Link to MIDI Clock.

## Receive Sync

- 1) Local-Host
- 2) MIDI Clock signal
- 3) Ableton Link.

When the Ableton Link its enabled the Local-Host and MIDI Clock will be disabled and viceversa.

In Local-Host when the app is connected through Inter-App Audio, will receive the Sync from the HOST (if available, i.e. tempo/start/stop) and the current BPM is overridden.

When MIDI Clock is activated, you cannot change the BPM (Slave) since is controlled by the MIDI Clock (Master). Through the 'CLOCK' button you can select a MIDI Clock Source.

## Essential and Recommended EMS Modifications

These superb extra features are available now through In-App Purchasing. You can access the 'In-App Shop' simply from the menu tools.



→ Tapping the Modification buttons will open the mod-view (and before you ask why these buttons are so small and concealed, we didn't want to mess with the original interface). You will find these symbols on the following iVCS3 modules:

- 1) Oscillators Synchronisation
- 2) Oscillator 3 Lo/Hi Range Switchable Oscillator
- 3) Oscillators 1 and 2 VC Shape
- 4) Sample & Hold
- 5) Filter Slew & Type<sup>1</sup>

<sup>1</sup> This Modification is available since ver 1.1.3 and it's not part of the In-App Purchasing: 'Essential and Recommended EMS Modifications'.

- 6) Envelope Shaper Attack and Decay Time Extension
- 7) Inverted/Controlled Matrix Red Pins
- 8) Joystick Glide

### **Oscillators Synchronisation**

The Sync feature provides a tonally harmonic sound, the VCO 2 is the MASTER and you can select VCO 1 or both VCO 1 and VCO 3 as slaves. This means every cycle of VCO 2 involves a resetting of the VCO slaves phase.

### **Lo/Hi Range Switchable Oscillator**

As standard, Oscillators 1 and 2 were meant to be tracking audio generators and Oscillator 3 an LFO. As the circuitry is almost identical Oscillator 3 may be converted to be the same as Oscillator 2. Please note that when the VCO3 is switched in 'High Range Mode', the Ramp Shape does not work anymore with 'Phase Sync Oscillators'. Also we've noted it's a bit more CPU intensive.

**WARNING:** when you switch VCO3 to Hi Range mode and you want to control the Oscillator via DK/KS, you have to set the level of your input channel to 0.26 volts per octave, not the 0.32V/oct for VCO1 and VCO2, otherwise you won't be able to use the keyboard in the predicted manner.

### **Oscillators 1 and 2 VC Shape**

This modification is often done with cheap Cliff 3.5mm jacks on the front panels, but cable patching is not really in the spirit of the VCS3. The toggle switch converts the matrix columns 'O' and 'P' (i.e. 'Output Ch. 1 and 2 Voltage Controlled') in 'Oscillator 1 Shape' and 'Oscillator 2 Shape' Voltage Controlled. The sensitivity range is  $\pm 3V$ .

### **Sample & Hold**

This modification brings a Simple Random Voltage Generator or a Sample & Hold to the iVCS3. You can switch between S&H to generate random numbers and hold them for a period of time and also Glide to generate a user-controlled random number series with interpolation between each new number. When enabled, the COLOUR parameter is the frequency with which new random numbers are generated in the range  $0.016 \div 10$  Hz. The LEVEL parameter is the range over which random numbers are distributed.

### **Filter Slew & Type**

The novel glide parameter was introduced to enhance the sound quality of the VCF and optimize the smoothing of the cutoff frequency control. You can adjust and trim this parameter to get the most concise sound. We've found

that the lower the glide threshold, the better the sound when the VCF is frequency modulated by oscillators. In other words, when high frequency controlled voltages are applied to filter, they are low-pass filtered by the C31 capacitor. This means that the filter will not respond to high frequency CVs, and respond slowly to rapid changes in incoming CVs. The knob parameter sets the C31 cap from the CV input circuit, so the filter will respond to high frequency controlled voltages.

N.B. Old parameters will set automatically to the maximum Glide amount (left), this parameter is saved for Snapshots, HVPad and will work with Control Manager.

The toggle enable the **zdf\_diode** filter i.e. Zero-delay feedback implementation of a 4 pole (24 dB/oct) diode low-pass filter. This filter design was originally used in the EMS VCS3 and was the resonant filter in the Roland TB-303.

The saturation amount to use for non-linear processing. Values > 0 increase the steepness of the NLP curve.

This filter is based on the work of Will Pirkle that employs Vadim Zavalishin's work with bilinear transforms to create topology-preserving transform (TPT) implementations of analog filters.

In order to take advantage of all the potential of this filter, we suggest you to deactivate the portamento (Slew) by turning the knob to the right.

### **Envelope Shaper Attack and Decay Time Extension**

This modification will give you an attack of 5 seconds and decay of up to 3 minutes. Press the ATTACK button and play!

### **Inverted/Controlled Matrix Red Pins**

Tap over the **Recovery Pins** (Matrix bottom) to change pin color: white, green and red. White pins are 2.7K Ohm resistance and green ones are 68K Ohm. In the digital domain this translates as: white pins no attenuation, green pins 0.66. Red pins will allow that connection to be adjusted between the normal signal and its inverse.

N.B. Old parameters will set automatically to a default resistors value (-1), this parameter is saved for Snapshots but is not enabled for HVPad of the Control Manager.

N.B. This is a setup parameter and it should not be adjusted during the performance. If you are playing a patch and moving the resistor control at the same time, you will encounter audio glitches.

### **Joystick Glide**

Each new step value of JOYSTICK is low-pass filtered to move towards that value at a rate determined by the Knob. This is the 'half-time' of the function

(in seconds), during which the curve will traverse half the distance towards the new value, then half as much again, etc., theoretically never reaching its asymptote.

N.B. Old parameters will set automatically to the default Glide amount, this parameter is saved for Snapshots but is not enabled for HVPad or for the Control Manager.

## Presets

Preset Manager will collect all the **Banks** (i.e. *.ivcs3 suffix*) and **Snapshots**. A *Snapshot* is a simple “photo” of the parameters in the UI (i.e. User Interface). Both the Matrix and Keyboard/Sequencer are included but they can also be excluded, see the Settings for more details.

So, once you find an interesting sound you can take a snapshot (i.e. save this new preset) by touching the ‘plus’ icon and this new preset will be added to the selected Bank. The top four elements of the Snapshots list are assigned for ‘HV Snapshot Pad’, you can then sort or delete the Snapshots in the List by tapping the ‘List Icon’. You can even share the selected Bank and you can restore the factory Built-In Banks from the ‘Cloud’ icon.

## Backup



Factory preset-banks (Excluded from iCloud back up)



Library preset-banks (Excluded from iCloud back up)



User preset-banks (Included in iCloud back up)

If you delete, overwrite, rename or save new presets in factory/library banks, the icon will change as User preset-banks , being backed up.

Snapshot banks are located in App Group folder, you can access files via built-in tools as 'Open In ...', 'Document Picker', 'E-Mail' etc.

## Use iTunes to share files between your computer and your device

- 1) Open iTunes on your Mac or PC.
- 2) Connect your iPhone, iPad, or iPod touch to your computer using the USB cable that came with your device.
- 3) Click your device in iTunes.
- 4) In the left sidebar, click File Sharing.

5) Select an app to see which files are available for sharing in that app on your device.



After you have added files through iTunes in the Documents App folder, you need to move them to the shared directory ('App Group').

This action will move all files from 'Documents' to 'App Group' folder. If an item with the same name already exists (in the 'App Group'), the file will not be overwritten.



Load a preset, randomly from the banks list.



Delete all Presets for a selected bank. A warning message will be displayed.

The Snapshots bank file is a kind of Property List format (*.ivcs3*), you can edit as text and modify the values just rename in *.plist*

Swipe (right to left) on a preset or bank to rename/duplicate/delete it.



The purpose of the unique **Snapshot Pad** is to obtain intermediate values between four snapshots (corners). You can change snapshots assigned in the corner through the Snapshots list (see above).

The Snapshots Pad performs complex interpolations between four snapshots on a two-dimensional space. By scrubbing your finger on the Snapshots Pad a temporary new snapshot will be created by mixing the four snapshots depending on distance. Thus you can modify hundreds of parameters with a single touch, this is also called *Hyper Vectorial Synthesis*.

Snapshots Pad can be resized on fullscreen for detailed controls (left bottom icon).

**N.B. Snapshot Pad have no effect on Matrix, Sequencer and Toggles.**

## Samples

Samples manager can read/write in the App Group folder, you can also share files through AudioCopy, Document Picker (iCloud, Dropbox etc...) and AudioShare. Samples manager can also read the Built-in files, but you cannot rename or delete them. Touch on a file in the list to show the actions popup. Here it is possible to **Load** a file in one of two Samplers (i.e. Sampler Ch.1 and Sampler Ch.2), Open In... contains all system actions over the file,

according to file type. For example you can send files as an e-mail, open file with a listed app etc...



You can rename files in the App Group folder, if you omit the file extension then Samples Manager will fill the original audio file extension for you. N.B. Samples manager shows only audio files supported, the other files in the App Group folder will not be seen.



You can pre-listen to the samples before you load them.



Starts audio capture from the microphone immediately and saves new stereo audio file in wav format 44.1 kHz, 16 bit in the App Group folder. Files created are composed by id-name followed by a number, for example:

Input Rec 4.wav, Input Rec 5.wav etc...

Every new file will be numbered with the next consecutive number.

N.B. You can record a mono or stereo file in wav format 16 bit 44.1 kHz according to the iDevice channels. Even if the iVCS3 is connected to Audiobus or IAA, the Grab Audio will record always from iPad microphone/line



You can import files from AudioCopy, Music Library, Document Picker (iCloud, Dropbox etc...) and AudioShare.

Access to the iPod library, this allows the application to read user's songs, audio books, and audio podcasts. The file can be converted in .wav (PCM 16 bit 44.1 kHz) or .caf formats and stored in the local app App Group folder. If the file exist at path then progressive number will be attached to the file name.

The document picker feature lets users select documents from outside your app's sandbox. These include documents stored in iCloud Drive and documents provided by a third-party extension. Users can open these documents directly, editing them in place. This access simplifies sharing documents between apps and easily enables more complex workflows.

### **Use iTunes to share files between your computer and your device**

See 'Presets' for more informations.

## Control



MIDI



Scrub Y



Accelerometer X



Accelerometer Y



LFO

After selecting **MIDI**, *iVCS3* enters into "learn mode" i.e. it "hears" incoming MIDI Control Change messages. It's then possible to send messages with MIDI hardware, Virtual MIDI and Network MIDI. Flashing screen means the association between the parameter and the MIDI message has been successful and displays the corresponding control Change and Channel. Alternatively you can enter direct CC and MIDI Channel number through number keyboard. You will also receive an additional setting: 'Widget Range' that allows you to resize the range of action on the parameter. This is because you can use all 128 steps MIDI to control precisely particular part of the parameters.



**Scrub Y** binds the widget to vertical movement on the keyboard (Scrub Y). An additional setting allows you to specify the speed (gravity) of the action.

**Aftertouch Y Scrub**, you **can** assign one or more *iVCS3* parameters to aftertouch scrub Y, so after a played note, you can scrub in the vertical axis (Y) by controlling one or more of the parameters. An additional setting allows you to specify the

speed (gravity) of the action.

N.B. Playing keys from top to bottom, you can change the amplitude of each note i.e. key velocity (0 ÷ 127). The same with black keys.

**Accelerometer X** and **Y** are used to control the parameters through the horizontal or vertical inclination of the device.

**LFO**, Low Frequency Modulation is a table look-up oscillator with seven built-in shapes. The frequency of LFO is expressed in Hz and BPM (Beats per Minute). You can get the period time by dividing 1/freq. The LFO Frequency value is converted in BPM (Beats Per Minute), you can adjust this value

through the minus/plus buttons, these will replace current value with the integer BPM (previous/next) or you can TAP to set your own Tempo.

- φ Will reset to zero the phase of current LFO.
- Φ Will reset to zero the phase of ALL LFO actives.



Enabling the Link symbol, you will disable the 'Low Frequency Oscillator in Hz' Slider, so the value of the current LFO is sampled from the global 'MASTER BPM'. You can adjust the BPM value from SYNC view. When the MIDI Clock or Ableton Link is enabled (see MIDI Manager and SYNC) the BPM value will affect all LFO enabled for SYNC mode. The goal of the 'SYNC Subdivision' Slider is to rescale the 'MASTER BPM' from SYNC according to the relative symbol (abbreviate musical note time values):

Normal : 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64

Triplets : 1/1T, 1/2T, 1/4T, 1/8T, 1/16T, 1/32T, 1/64T

Dotted : 1/1D, 1/2D, 1/4D, 1/8D, 1/16D, 1/32D, 1/64D

Where 'D' is a **dotted** note and 'T' is **triplet**.

With 1/4 (Default), the BPM follows the 'SYNC BPM' or 'MIDI Clock' BPM when enabled, i.e. 120 BPM corresponds to 1 Hz.

- 1/4 - each step is a quarter note (or BPM), e.g. 60 BPM is 0.5 Hz
- 1/4D - each step is a dotted quarter note (or 1.5 x BPM),
- 1/4T - each step is a triplet quarter note (or 0.5 / 3) etc.

♪ Reset default value (1/4 = 120 BPM)

## MIDI

You can enable/disable the incoming MIDI signal from all the physical, virtual and network ports available. The MIDI Clock is managed by SYNC, see the SYNC section for more details.



If the Core MIDI Network is connected a wifi symbol will appear in the Network port cell.

**Channel** sets the input channel for the selected port, the *iVCS3* DK (Keyboard) will receive the Note On/Off messages in OMNI (from all 16 channels) or, one of the 16 channels.

## **Configure Bluetooth LE MIDI**

With the release of iOS 8 and OS X Yosemite, sending and receiving MIDI data is supported using Bluetooth Low Energy connections on any iOS device or Mac that has native Bluetooth Low Energy support. All established connections are secure which means that pairing is enforced and connections cannot be made to your devices without your explicit consent. After a connection is established, it simply appears as an ordinary MIDI device that any MIDI application can communicate with.

## **Enable NRPN**

NRPN stands for "Non-Registered Parameter Number" and is part of the MIDI specification for the control of electronic musical instruments. NRPNs allow for manufacturer-specific or instrument-specific MIDI controllers that are not part of the basic MIDI standard.

Unlike other MIDI controllers (such as velocity, modulation, volume, etc.), NRPNs require more than one piece of controller data to be sent. First, controller 99 - NRPN Most Significant Byte (MSB) - followed by 98 - NRPN Least Significant Byte (LSB) sent as a pair specify the parameter to be changed. Controller 6 then sets the value of the parameter in question. Controller 38 may optionally then be sent as a fine adjustment to the value set by controller 6.

This fine adjustment is part of the conventional MIDI controller specification, where any of the first 32 controls can be optionally paired with a control offset 32 higher. This is the rare 14-bit Continuous Controller feature of the MIDI specification, and NRPNs simply take advantage of that existing option in the same way offering 16,384 possible values instead of only 128.

(<http://en.wikipedia.org/wiki/NRPN>)

When you enable NRPN, you should not employ CC 99 and 98 as the normal CC in order to avoid an undesired overlap. An NRPN message must be sent with this order: CC 99 98 6 38 where the first couple is the CC number and the second couple is the data. You can MIDI learn as for the normal CC, and NRPN works for all knobs and parameters. Although an NRPN CC number can be greater than 127, you will not be able to learn CC beyond 127.

## **Program Change for Presets Selection**

You can select Presets (current selected bank) by remotely sending a MIDI Program Change. You can select the MIDI channel where you can receive PC messages. A PC value of zero will select the first preset in the list, a value of 1 for the second etc... The range is from 0 to 127.

## Back Panel

This Back Panel adds features to the app (such as Sequencers, Samplers and Effects) and should be thoroughly utilized as a further experimental environment:

OUTPUT Channels feeds a chain of Flanger/Delay/Compressor FX.

INPUT is from hardware Microphone or software bus as Audiobus/Inter-App Audio or from Integrated Samplers. INPUT can be also feed from DK/Sequencer or From SCOPE feedback.

All Signals connected to the METER in the Matrix, will be shown in the Oscilloscope and you can feedback through to the VCS3.

### Ext. Input

The first features is the [Dk/Sequencer], [Mute] or [Mic/Sampler] switch. As you know the VCS3 is Voltage Controlled Based and you have to remain aware that the DK Keyboard or Sequencer or Sampler provides a Voltage Signal which feeds the VCS3. You can get this from Matrix Row 8 and 9 (Input Channel 1 and 2) and you can employ this for controlling or feeding the VCS3 audio modules. This triple switch is a source selector or mute.

You can select Ext, Input between DK/Sequencer or Mic/Sampler (or Audiobus/Inter-App), for each channel. You will get these through the Matrix INPUTS CH1/CH2. In Mic/Sampler mode, you can mix both signals and enable/disable the **Envelope Follower** unit generator in order to extract the amplitudes profile of the incoming signal (Mic/Sampler). The **Envelope Follower** transforms the an audio signal in a control signal (DC) to use it as controller. Muted is mainly used for clearing the Ext Input if you intend on feeding back through SCOPE Jack-socket.

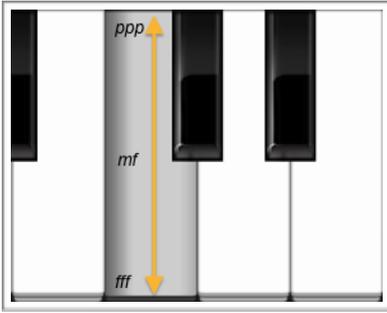
### DK Keyboard

VCS3 Keyboard DK produces a voltage control signal of 3 Volt.

Middle F# produce 0V, High C -1.5V and Low C +.5V (select three octaves view from Settings).

As you know you can employ DK as Controller Voltage based or play DK with internal VCO (saw). For this you have four controls: **Frequency**, **Dynamic Range**, **Tuning Spread** and **Level**. As explained, middle F# produce 0V, if you want to tune the *iVCS3* you will need to play F# adjusting the **Frequency** knob to 369.99 Hz (i.e. tempered F#4 and is default value for VCO 1 and DK VCO Frequency). Thus you will achieve standard musical scale tuned to 440 Hz (diapason). Likewise, when you employ DK as Voltage Controller, you must calibrate the VCO Frequency controls.

In the original VCS3, the **Tuning Spread** range is +- half semitone (although it is voltage), where zero spread produces no tuning deviation. In *iVCS3* this range was extended to +- 2 semitones and default value is 0 (which means



no spread). When you use DK as Voltage Controller, tuning spread can be done by the Input Level (Ch.1 or 2) on the main panel.

IN order to achieve perfect pitch from the DK (temperate scale) you need to set the Input Level Channel 1 or 2 to 0.32v. If input level knobs are at other settings you'll get +- tones per keyboard octave, this is good for using other scales like quarter tone, 19 or 21 notes/octave or such.

**WARNING:** when you switch VCO3 to Hi Range mode (Essential and Recommended EMS Modifications) and you want to control the Oscillator via DK/KS, you have to set the level of your input channel to 0.26 volts per octave, not the 0.32V/oct for VCO1 and VCO2, otherwise you won't be able to use the keyboard in the predicted manner. See 'Essential and Recommended EMS Modifications' for more informations.

**Dynamic Range.** The DK keys have a built-in VCO, when you are playing with this VCO and the DYNAMIC VOLTAGE knob is turned left (disabled) the amplitude of the DK VCO plays with the same amplitude (mezzo forte). The level of DK VCO is controlled according to touch position of DK keys: top: pianissimo, middle: mezzoforte, bottom: fortissimo). Playing *iVCS3* keyboard keys from top to bottom, you can change the amplitude (dynamics) of the note i.e. MIDI key velocity (0 ÷ 127). Another new feature of DK is that there is a VCA inside where you can send an audio signal from the *iVCS3* for mixing with the internal DK VCO.

If you send something to the METER (i.e. SCOPE jack-socket) row, then that will go to the DK and the signal will be mixed with the internal DK VCO, you control the mix with the DK **Level**. Then you can send this mixed signal back to the VCS to input 1 by putting the switch to "signal". The keyboard dynamic (velocity) will affect this mixed signal! So, for example, you can send, lets say, VCO 1&2 to METER, then they will go to the DK "mixer" and mix the internal DK VCO as the third VCO. Then put switch1 to "signal" and switch2 to "key voltage". Input 1 goes to "input 1" row in the *iVCS3* and so this is the mixed signal of the three VCOs but with the level controlled by the keyboard dynamic. Key voltages go to input2 so that you can patch to VCO1 & 2 frequency, so all three can track in pitch.

Another difference between the Original Analogue DK and *iVCS3* DK is the "Legato behavior". In the Original DK, the priority goes to the highest note, this means that if you're holding down a note, the lowest notes can not be played until you release the held note.

Now you can switch between the Original VCS3 legato and NEW (to improve the playability of the keyboard on the 'legato') through the Settings.



**Locking the DK Keyboard** (in the DK Keyboard) means that every note is sustained. So when you play a note it will hold the last pressed key even when you lift your finger from the keyboard. When the Keyboard is locked, Snapshots will save/restore touched keys, see Settings for more explanations.

## Sequencer

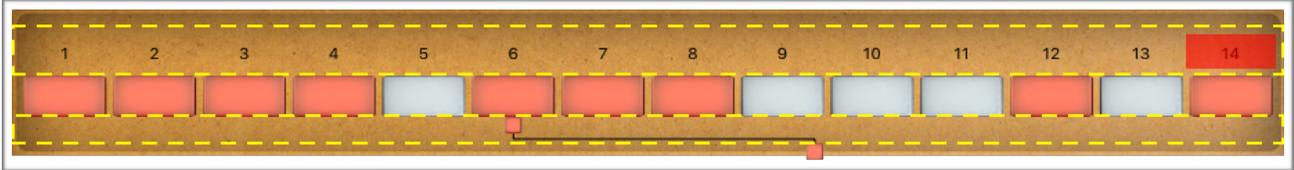
Also note that the DK Keyboard puts a 1V for octave output, so you need to trim this voltage using the Input Level Channel 1 or 2 to 0.32v if you want 12 notes within an octave. If input level knobs are at other settings you will get +- tones per keyboard octave, this is good for using other scales like quarter tone, 19 or 21 notes/octave.

Sequencer is fully programmable, you can impose direction, steps number, tempo and random direction from the Sequencer Manager, while Groove Values sets information for every step.

We have two independent groove values, one for the DK and another for the Joystick. Every groove takes two values for every step: Key and Dynamics. An auxiliary groove with one parameter is for Channel 1 Panning and is expressed as an absolute and will overwrite (when enabled) Ch1 PAN (Ext.) in the Main Panel. Joystick and Panning Grooves can be disabled. In order to record values in the Groove, you will need to Tap DK or STICK buttons and Keyboard AKS information will be shown. With KS you can program Keys and Dynamics. Dynamics are controlled by playing keys along the key's vertical: 0 V in the middle part of the key height, pianissimo at the top and fortissimo at the bottom (see Dynamic Range for more details). DK Groove values are strictly correlated to DK values.

When you enable 'Record' in KS (Sequencer), every note will skip to next Sequencer groove step, allowing consecutive notes and dynamic programming. And for Random and Fifth, Third, etc tone buttons: the Random will play a random note every time you push it. It works for the current groove step or also when recording a sequence ('Record' enabled). The other buttons will transpose the sequence by the amount it says and they can be combined (you can touch several at time for doing more intervals). These interval buttons don't transpose the recorded sequence but introduce an offset voltage when touched down. After programming Grooves, you can enable or disable every Sequencer step by pushing down Steps buttons. Also you can Sync and/or jump through steps during performance, touching the top bar step numbers, the same goes for selecting programming Groove, below.

### Step numbers bar <-->



### Groove bar <-->

The Sequencer has two separate Voltage Outputs. One for the keyboard (DK keyboard) going to Input 1 (Keys) and Input 2 (Dynamics). The other Voltage Output goes from the Sequencer to the Vertical and Horizontal STICK rows (Vertical is the Keyboard Voltage and Horizontal is the Dynamics). You can disable/only vertical/both the Joystick Outputs from the toggle. N.B. The Joysticks Vertical Range (16) must be set to 0.32 (0.32 V/Octave sensitivity for an 'equal scale') as for Input 1 (8). The Joystick handles work as an offset, you can reset it to zero (central handle position, double tap for reset).

### DK GROOVE:

Keyboard Voltage → Input 1 (8)

Dynamics Voltage → Input 2 (9)

### STICK GROOVE:

Keyboard Voltage → Vertical Stick (16)

Dynamics Voltage → Horizontal Stick (15)

## Sequencer SYNC



By enabling the SYNC switch, (green highlighted) you will not longer be able to set the local tempo since now the TEMPO is sampled from Master SYNC Clock. You can subdivide the SYNC Tempo from the Subdivision Menu.

Subdivision Menu will show a list of symbols that abbreviate musical note time values:

Normal : 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64

Triplets : 1/1T, 1/2T, 1/4T, 1/8T, 1/16T, 1/32T, 1/64T

Dotted : 1/1D, 1/2D, 1/4D, 1/8D, 1/16D, 1/32D, 1/64D

Where 'D' is a **dotted** note and 'T' is **triplet**.

With 1/4 (Default), the Sequencer will fire a 'step' every BPM according to 'Local Tempo' or 'Ableton Link' BPM.

- 1/4 - each step is a quarter note (or BPM),
- 1/4D - each step is a dotted quarter note (or 1.5 x BPM),
- 1/4T - each step is a triplet quarter note (or 0.5 / 3) etc.

## Feedback

The SCOPE jack-socket is connected to Column A in the Patchboard (Matrix) and therefore sees any output connected to the METER. In conjunction with the Control Output sockets there are three possible ways of gaining access to the Matrix Board. Although this socket is marked SCOPE (for Oscilloscope), it can be used for a variety of purposes, including feeding back a signal into the Studio via one of the Input Amplifiers (see section V in the official VCS3 Putney User Manual). Naturally you can rescale feedback signals with knobs (exponential knobs).

## Oscilloscope/Spectral

Oscilloscope can manage time scale for zooming and amplitude input gain, you can read either DC and AC signals.

In Spectral mode, the time scale and amplitude are used as exponent to logarithmically display the frequency and amplitude. The **frequency analysis** FFT (i.e. Fast Fourier Transform) is 4096 samples.

## Mic/Samplers

You can feed *iVCS3* with two samplers and/or mixed signal from microphone /line or Audiobus/Inter-App Audio when connected. See the original VCS3 manual for more details.

You can touch and drag the sampler's waveform to scrub the audio file. The speed of the scrubbing is relative to the position of the finger inside the waveform: higher positions produce faster scrubbing



Tap the symbol to set the loop points. When in "loop edit mode" you can:

- tap and hold inside the selection for the fine regulation of the loop
- double tap inside the selection to select again the whole file

When a loop is set, deselect the (tap again ) to zoom-in into the loop selection.



Reset scanning to the start position.



Waveform Scrubbing Mode, when selected the pointer jumps to the **Absolute** position of the finger that touches the waveform. If unselected (**Relative**) it does not jump but the scrubbing occurs from Sampler position toward finger touch.



From left to right:

- 1) Reset to beginning both samplers
- 2) Synchronise the sampler Ch. 2 phase according to sampler Ch. 1
- 3) Load an audio sample, see Samples Manager for mode details.

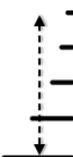
If you are loading a stereo sample, you can chose the input channel: left/right or 50% mix of both channels.

It's possible trigger the 'reset scanning' from DK or the Sequencer.

Finally you can link the Ratio of Sampler Ch.2 with the Sampler Ch1 (lock icon), in this mode you can feed iVCS3 with stereo files and keep the scanning ratio synchronised.

**N.B. You can disable the Crossfade and change Waveform style from the Settings.** See the Settings for more details.

## FX

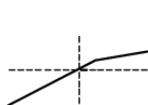
 Just outside of the Master Output (Matrix Columns B and C) this Flanger/Delay effect can be toggled in three positions: Off, Flanger and Delay, **FLANGER**: The '*lfo*' (i.e. Low Frequency Modulation) and '*d*' (i.e. Delay) knobs adjust the frequency and amplitude of the controlling oscillator. Increasing the amount of feedback, with the '*g*' (i.e. Gain or Feedback) knob will produce more metallic timbres by reinforcing and emphasizing the harmonic resonances of the internal delay line whose length (and resulting resonant frequency) is set by the delay knob.

**DELAY:** The 'd' knob sets the length of the delay line with lower settings corresponding to shorter delays. The amount of feedback, controlled with the 'g' knob, will determine how many "echoes" will be heard – this is the echo-density.

Note: Wild and wonderful pitch glissandi will result from riding or randomizing the 'd' knob. This is because you are changing the length of the delay-line on the fly and this has the effect of temporarily transposing the "sample" that is loaded into the delay line at that time.

Note: The delay line is cleared and reset when you toggle the on button.

Note: 'd' time in **Flanger** is in the range 1 ÷ 10 Milliseconds, while in **Delay** is in the range 10 ÷ 2000 Milliseconds. **Flanger** 'lfo' is in the range 0.01 ÷ 10 Hz while in **Delay** mode is in the range 0 ÷ 1 for dry/wet mix.



Dynamic Compressor/Expander. This unit functions as an audio compressor, limiter, expander, using either soft-knee or hard-knee mapping, and with dynamically variable performance characteristics.

## Settings

**Sampling Rate**, for full-range audio, the recommended sampling rate is 44.1 kHz. Using a lower rate *iVCS3* will reduce the number of samples that has to calculate, this will facilitate your Device's burden, but it will also reduce the frequency range. If your device is struggling at 44.1 kHz, you should try a lower rate and/or increase Buffer Size.

**Buffer Size** set the Audio Device latency. When you run *iVCS3* from **Audiobus**, or **Inter-App** this value will be taken from **Audiobus** or **Inter-App Host**. Warning! When an app runs first and keeps running in the background, the Sampling Rate and Buffer Size will impose for the whole iOS while running.

**Keyboard Split (Octaves)** sets the number of keys visible in the main view.

### Spring Reverberation

You can select one of the six reverberation modes.

**FDN** is 8 delay line stereo FDN reverb, with feedback matrix based upon physical modelling scattering junction of 8 lossless waveguides of equal characteristic impedance. Based on Csound orchestra version by Sean Costello.

**Parametric** is the Eugenio Giordani Schroeder model.

**IR** implements direct convolution with VCS3 Spring Impulse <response Sample.

**Hybrid 1** perform an hybrid model between FDN/IR

**Hybrid 2** perform an hybrid model between Parametric/IR

The last **FTConv** perform a convolutions between signal and IR pre-loaded table in memory. Thus you can perform some interesting actions, (abbreviate or retrograde IR) achieve very interesting results.

**Spring crash** use hardware accelerometer for triggering spring tilts, as the original.

### **Ring Modulation**

The Ring Modulation (i.e. RM) was one of the most recognisable effects used by the BBC Radiophonic Workshop. It was the effect used to create the voices of both the Cybermen and The Daleks for Dr Who.

The *iVCS3* app implements three types of RM:

- 1) 'Ideal' performs a simple multiplication between two signals A and B;
- 2) 'VCS3' use a quadratic operator and can also simulate the vintage leakage as the original;
- 3) 'Diode' is an implementation of Julian Parker's digital model of a Ring Modulator. N.B. The RM 'Input A' is the Modulating Signal and the 'Input B' is the Carrier Signal. By inverting the order you can achieve different sound results.

### **Include in Presets**

The switch in this section is designed to include or exclude the Matrix, Keyboard, Sequencer, Control Manager and Knobs Color when you save new preset.

**Snapshot Pad Resolution Update** sets the time interval for the interpolations, from about 15 to 350 milliseconds. Short times for higher resolution but higher consumption of CPU.

**Save/Restore the Last App Setup**, when you exit from the application, save the status (all *iVCS3* and Fx Parameters) and reload when next opening the app.

**Joystick Handle Springy**, enable/disable.