Version 1.2.0 – November 2013

Changes from Version 1.1.0

1: Sync-Shift ITB feature added in Options Menu.

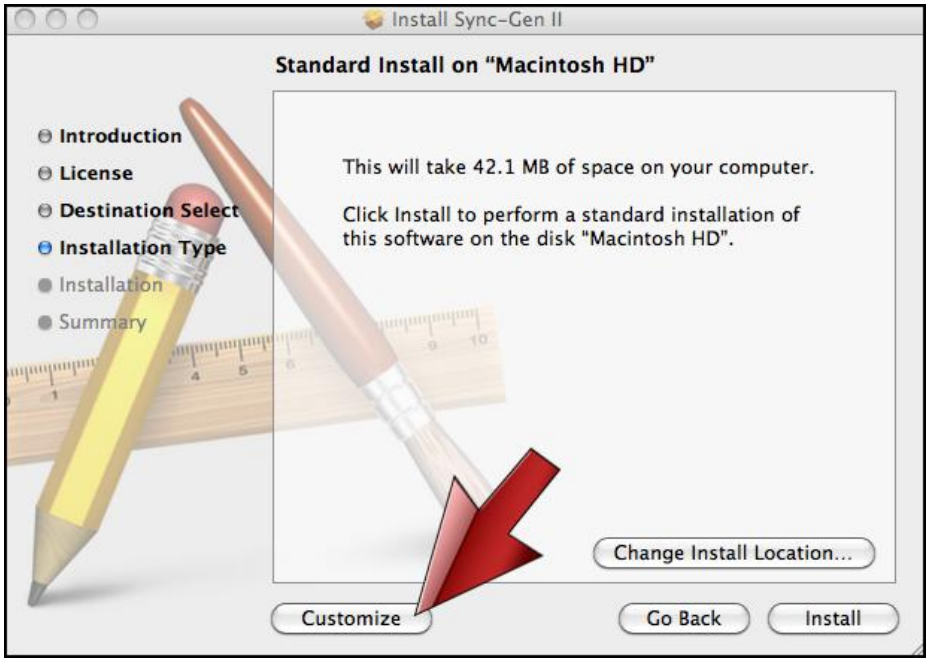
Sync-Gen II is compatible with Mac OSX 10.4 (32 bit - Intel/PPC) and later, Mac OSX 10.6 (64 bit - Intel) and later, Windows XP, Vista, Windows 7 and 8**.**

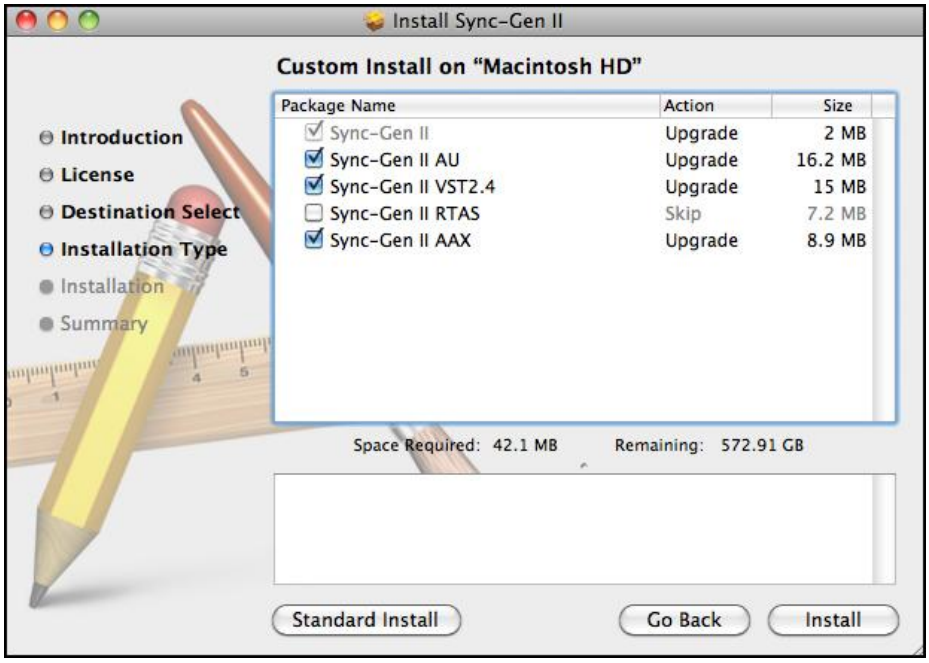
Sync-Gen II runs in VST, AU, and RTAS and AAX formats in 32 and 64 bit hosts.

RTAS Support: Pro Tools 7.0 and later.

MAC-OSX Installation

(1) Open [**Sync-Gen II OSX Setup V120.dmg**] and follow the installer instructions on screen.
(2) For new User-Select Install Options – Click 'Customize'
(3) Select the components you wish to install.





Windows Installation

(1) Open the [**SyncGen II setup V120 .exe**] installer and follow instructions on screen

Connections and Setup for correct Operation

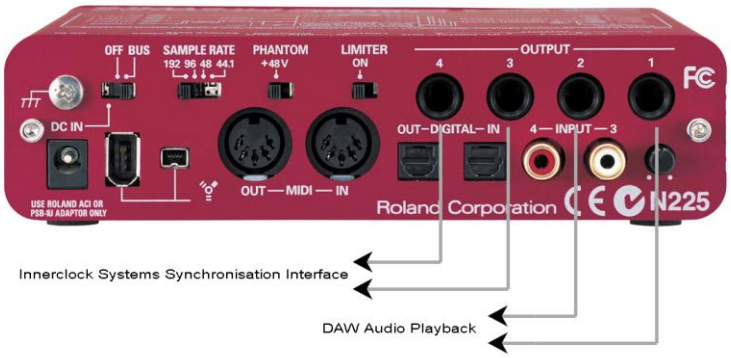
Sync-Gen II is a true Stereo Plug-in. Two separate channels of pulses are required for correct operation when used with your Innerclock Systems synchronisation interface.

- Channel One (Left Hand Side) provides the continuous sync pulses from the Sync-Sequencer.
- Channel Two (Right Hand Side) provides the continuous transport pulses from the Transport-Sequencer and the DAW Host Transport commands.

Soundcard Output Assignment

You will require a DAW soundcard with a minimum of four separate outputs for correct operation of **Sync-Gen II** and your Innerclock Systems synchronisation interface. No DC Coupling or any other electronic modification or special cables are needed.

- Outputs 1+2 for your normal DAW Audio Playback
- Outputs 3+4 for your **Sync-Gen II** Plug-in Playback



Levels

All Innerclock Systems Sync Interfaces use sophisticated electronics and software to convert full frequency AC audio signals into precision synchronisation clocks within 20 microseconds.

A pulse input signal of -20dB is the ideal operation level for reliable and jitter-free sync generation. Too much or too little input signal will lead to erratic and unstable synchronisation. If your external hardware does not slave-sync correctly, check the output levels of **Sync-Gen II** in your DAW Mixer Window.

By default the output levels of **Sync-Gen II** are set correctly in the software preferences on first launch. Certain soundcard outputs may be calibrated differently **[-10dB, 0dB, +4dB]** and you may need to adjust the output levels of **Sync-Gen II** to match.

To do this see page 21.

These new levels are stored within **Sync-Gen II** preferences and will remain set until changed.

- Connect whichever output of your soundcard is producing the continuous sync signal from the Sync-Sequencer side of **Sync-Gen II** (Left Hand Side) to the **[Clock In]** input of the **Sync-Gen IILS** Module.
- Connect whichever output of your soundcard is producing the continuous sync signal from the Transport-Sequencer and the DAW Host Application transport commands side of **Sync-Gen II** (Right Hand Side) to the **[Trans In]** input of the **Sync-Gen IILS Module**.

Other Connections

Power

On the rear of your **Sync-Gen IILS** Module there are two sockets for providing power. In your **Sync-Gen IILS** packaging you will find two power looms to suit both power supply formats as required for your particular modular system configuration.

Midi CLK Out (Midi Clock)

Connect this to any Hardware Midi Device or Software Midi Interface that accepts Midi Clock Input.

DIN-SYNC Out (Din-Sync/Sync 24)

Connect this to any Hardware Din-Sync Slave Device that accepts Din-Sync Input.

Trigger Pulse Outputs

There are nine 1/8" Mini Jacks that provide continuous and sample-accurate rhythmic trigger pulses **[5ms/+5VDC]** when the DAW is running.

From the top of the **Sync-Gen II** Module down these are as follows:-

(a) **[1]** – One Trigger Pulse is generated at the start of each Whole Bar
(b) **[2]** – One Trigger Pulse is generated every Half Bar
(c) **[2]** - One Trigger Pulse is generated every Half Bar
(d) **[4]** - One Trigger Pulse is generated every Quarter Note Division
(e) **[4]** - One Trigger Pulse is generated every Quarter Note Division
(f) **[8]** - One Trigger Pulse is generated every Eighth Note Division
(g) **[8]** - One Trigger Pulse is generated every Eighth Note Division
(h) **[16]** - One Trigger Pulse is generated every Sixteenth Note Division
(i) **[2T/4T]** - One Trigger Pulse is generated every 2^{nd} or 4^{th} Triplet Note Division

Invert Toggle Switches

There are nine Toggle Switches assigned to each of the trigger pulse output jacks. The first eight of these allow you to select **[Normal/Left Switch Position]** or **[Inverted/Right Switch Position]**. Normal Position corresponds to rhythmic 'On' and Inverted Position corresponds to rhythmic 'Off'. These may all be used in real-time with no loss of sync position or added tempo-jitter while the DAW is running.

2T/4T Toggle Switch

[Left Switch Position] indicates that continuous Half Bar Triplet Trigger Pulses are generated at this trigger pulse output jack. **[Right Switch Position]** indicates that continuous Quarter Note Triplet Trigger Pulses are generated at this trigger pulse output jack. This switch may also be used in real-time with no loss of sync position or added tempo-jitter while the DAW is running.

Reset Pulse Output

This 1/8” Mini Jack generates a single Trigger Pulse **[5ms/+5VDC]** on DAW Stop.

LEDs

There are thirteen LEDs on the **Sync-Gen IILS** Module.

(a) **Rhythmic Trigger Pulse Outputs 1-9:** These flash continuously whenever a Trigger Pulse is generated at the output.
(b) **Clock and Trans Inputs**: These glow continuously when the **Sync-Gen IILS** Module is receiving audio pulse signals from the **Sync-Gen II** software.
(c) **Reset Trigger Pulse Output**: This flashes once whenever the DAW is stopped.
(d) **BPM/Tempo LED**: This LED is in between the Midi CLK and Din-Sync output connectors and flashes once per Quarter Note when the DAW is running.

Sync-Gen IILS Module Technical Specifications

- Sample-Accurate Rhythmic Pulse Synchronisation between any DAW Host and any Modular Synthesizer System
- Absolute Zero-Start Lag/Zero-Latency with precision Sync-Offset adjustment using included **Sync-Gen II** software.
- Programmable Pulse-Swing and Sync-Stutter using included **Sync-Gen II** software.
- True Plug and Play Operation – works with any Multi-Channel Audio Interface.
- No DC-Coupled or modified hardware or custom DIY cables required.
- Includes **Sync-Gen II** software – **AU/VST/EFX/RTAS/AAX** – Win/Mac – 32/64 bit
- All Outputs Simultaneous and Phase Locked
- Fixed **20usec** Audio Pulse to Sync Conversion Timing Core
- Clock Input Impedance: 50k
- Clock Input Threshold Range: 350mV – 1.40V (500mV Optimum)
- Transport Input Impedance: 50k
- Transport Input Threshold Range: 350mV – 1.40V (500mV Optimum)
- Trigger Outputs: 5ms Pulse Width/+5VDC
- Power: +/-12VDC or +/-15VDC (Euro and KK sockets provided)
- Current Draw: 30mA @ +12VDC
- Module Width: 14HP

Sync-Gen IILS Included Accessories

- Operation Manual
- Euro Power Ribbon
- KK Power Loom
- M2.5 and M3 Black Hex Mounting Hardware
- M2.5 and M3 Black Nylon Mounting Washers

Overview

(1) **Sync-Gen II** is a purpose-specific, sample-position accurate and tempo-grid precise External Tempo-Sync and Transport Control Generator/Sequencer Plug-in for the Innerclock Systems **Sync-Lock**, **Cynq-Lock** and **Sync-Gen IILS** external DAW synchronisation interfaces.

The Plug-in Interface can be seen as three distinct sections:

(a) The Sync-Pulse Sequencer

(b) The Transport-Pulse Sequencer

(c) The Options, Manual Control and Sync-Offset Section

The Sync-Sequencer

The Sync-Sequencer is responsible for creating the raw audio pulses that allow the **Sync-Lock**, **Cynq-Lock** and **Sync-Gen IILS** interfaces to generate their sample-accurate and grid-relative external tempo-sync. Midi Clock and Din Sync require rapid PPQ (Pulses per Quarter Note) to keep time – 24 Pulses per Quarter Note or 96 Pulses per Bar of 4/4. Working with such rapid fire pulses in a traditional sequencer environment is complicated because most of the pulses required fall in between rhythmic grid positions. They are not 'heard' as such but they must always be there to keep accurate tempo. The **Sync-Gen II Sync-Sequencer** is unique because we have designed an interface that allows the user to program and swing the raw sync pulses in a variety of musically creative ways while the software code always maintains the correct number of outgoing pulses to keep everything perfectly in time.

Global Settings

Global Swing: Minimum = **50% [OFF]** Maximum = **75% [Full]**. Change the value of these thumbwheels using the mouse. The Swing setting here is applied across all bars in the pattern unless they have specific swing settings of their own.

Global Swing Interval: [8ths] or **[16ths]**. This determines if the sync pulses generated by **Sync-Gen II** swing in 8th or 16th note rhythmic intervals.

Global Pattern Length: [1] thru to **[8]**. This sets how many bars will be looped within the pattern.

Global Pattern Rate: WHITE Numbers – Normal Operation - [12], [16], [24], [32] and [48]. Midi Clock and Din Sync slave devices require 24 PPQ (Pulses per Quarter Note) to match a Master DAW tempo at a 1:1 ratio. A setting of **[24]** which is the default value provides a 1:1 tempo ratio between the DAW, your Innerclock Systems interface and your external devices. If the DAW is playing at 120 BPM, the external devices will play at 120 BPM also. A setting of **[48]** or **[12]** will mean that external devices play at double and half the DAW Tempo respectively. Settings of **[16]** and **[32]** provide for half time and double time external triplet sync.

Global Pattern Rate: RED Numbers – Special Mode - [32], [24], [16], [12], [8] and [4]. When the numbers shown here are in RED, the Sync-Sequencer generates one pulse for every active step. By connecting a simple breakout box to a single Din-Sync output from either the **Sync-Lock**, **Cynq-Lock** and **Sync-Gen IILS** interfaces it is possible to gain access to the raw Sync Pulses on that specific port. Connecting a cable from the breakout box to a Step-Sequencer or Synthesizer EG provides direct clocking from **Sync-Gen II** and your DAW Application. Using these Special Mode Global Pattern Rate values provides variable clocking rates and also allows full pattern programmability because the Sync-Sequencer Steps provide 1:1 Pulse Generation.

Individual Bars

Step Select and Status: There are 16 individual step switches and lamps across the top of the Sync-Sequencer section. By default all Steps are **[On]** and **[Active]**. An active step generates a specific number of sync pulses as set by the **[Pattern Rate]** and/or **[Bar Rate]** thumbwheel selectors. Individual steps may be switched on/off while the DAW is playing without altering sync stability.

Bar Indicator/Selector: Sync-Gen II provides a maximum of 8 bars of looped programmable Sync Pulse generation. You may select any pattern Loop Length number **[1-8]** using the **[Global Pattern Length]** Thumbwheel. Select any bar with a single mouse click. This shows the steps and the individual parameter settings for that specific bar. Bars may be selected for editing while the DAW is playing without altering sync stability.

The Bar Indicators can have three colour modes depending on running status:

Full Red – This is the Bar that is currently playing and is also Active for Editing.

Red/Yellow – This is the Bar that is currently playing.

Yellow – This is the Bar that is Active for Editing .

Active Bar Edit: **[On]** or **[Off]**. Select any bar with the mouse and switch **[Active Bar Edit]** to **[On]**. The parameters **[Bar Swing], [Bar Rate], [Bar Start Step]** and **[Bar Length]** are now active and most importantly override the Global Pattern settings for that specific bar only.

Bar Swing Interval: [8ths] or **[16ths]**. This determines if the pulses generated by **Sync-Gen II** swing in 8th or 16th note rhythmic intervals for that specific bar only.

Bar Swing: Minimum = **50% [OFF]** Maximum = **75% [Full]**. Change the value of these thumbwheels using the mouse. The swing setting here is applied only to the Active and Selected Bar.

Bar Rate PPQ: WHITE Numbers – Normal Operation [12], [16], [24], [32], and [48]. This allows synchronized tempo changes for individual Bars within a looped global pattern. Same information as for Global Rate - Slave Midi Clock and Din Sync devices require 24 PPQ (Pulses per Quarter Note) to match a Master tempo at a 1:1 ratio. A setting of **[24]** which is the default value provides a 1:1 tempo ratio between the DAW and your external devices. If the DAW is playing at 120 BPM, the external devices will play at 120 BPM also. A setting of **[48]** or **[12]** will mean that external devices play at double and half the DAW Tempo respectively. Settings of **[16]** and **[32]** provide for half time and double time external triplet sync.

Bar Rate PPQ: RED Numbers – Special Mode - [32], [24], [16], [12], [8] and [4]. When the numbers shown here are in RED, the Sync-Sequencer generates one pulse for every active step **for that specific Bar only.** By connecting a simple breakout box to a single Din-Sync output from either the **Sync-Lock**, **Cynq-Lock** and **Sync-Gen IILS** interfaces it is possible to gain access to the raw Sync Pulses on that specific port. Connecting a cable from the breakout box to a Step-Sequencer or Synthesizer EG provides direct clocking from **Sync-Gen II** and your DAW Application. Using the Special Mode Global Pattern Rate values provides variable clocking rates and also allows full pattern programmability because the Sync-Sequencer Steps provide 1:1 Pulse Generation.

Bar Start Step: [1] thru to **[16]**. By default all bars start playback at Step 1. Changing this setting in an Active Bar changes the Start Step number for that bar only.

Bar Length: [1] thru to **[16]**. An individual bar may have any set length between 1 and 16 steps.

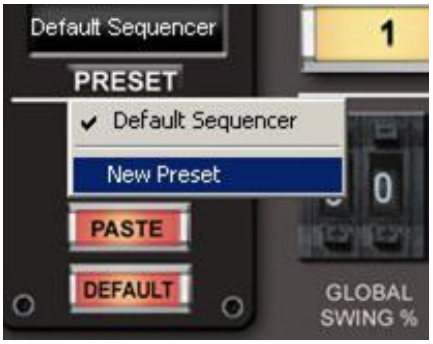
Pattern Management – Copy/Paste/Default/Preset/ Save

Copy and Paste: Any individual bar settings may be copied to another. Select the bar you wish to copy **from** with the mouse and click **[Copy]**. Now select the bar you wish to copy **to** and click **[Paste]**.

Default: Click this button to return any selected bar to its default setting.

Preset: Clicking this button opens a new window that lets you:-

(a) Load the **Default** Sync-Sequencer Pattern.
(b) Load a previously created and saved Sync-Sequencer Pattern.
(c) Create a **[New Preset]** Sync-Sequencer Pattern.



Selecting **[New Preset]** brings up a new window:-

Options here are as follows:-

(a) **[Current Settings]** – This creates a new Sync-Sequencer Preset with all the current edits and settings.
(b) **[Init Settings]** – This creates a new Sync-Sequencer Preset with Default settings.
(c) **[Cancel]** – This takes you back to the Main screen without creating a new Sync-Sequencer Preset.

Name: Clicking on the **[Name]** tab lets you edit the new Sync-Sequence name.

Save: This button saves the new Sync-Sequence and Name into the Preset List.

The Transport Sequencer

Similar visually to the Sync-Sequencer section, the Transport Sequencer follows the same operational principles but instead controls the Transport side of the **Sync-Lock**, **Cynq-Lock** and **Sync-Gen IILS** interfaces. This unique feature allows you to decide where you want your slave devices to Start, Stop and Re-Start anywhere within a sequence pattern.

Step Select and Status: There are 16 individual step switches and lamps across the top of the Transport-Sequencer section. By default all Steps are **[ON]** for continuous normal operation. Individual steps may be switched on/off while the DAW is playing without altering sync stability.

Bar Indicator/Selector: Sync-Gen II provides a maximum of 8 bars of looped programmable Transport Pulse generation. You may select any pattern Loop Length number **[1-8]** using the **[Global Pattern Length]** Thumbwheel. Select any bar with a single mouse click. This shows the active steps, Bar Start Position and Bar Length for that specific bar. Bars may be selected for editing while the DAW is playing without altering sync stability.

The **Bar Indicators** can have three colour modes depending on running status:

Full Red – This is the Bar that is currently playing and is also Active for Editing.

Red/Yellow – This is the Bar that is currently playing.

Yellow – This is the Bar that is Active for Editing.

System Lock: [On] or **[Off]**. This locks or unlocks the entire screen against accidental changes.

Pattern Length: [1] thru to **[8]**. This sets how many bars will be looped within the pattern.

Bar Start Step: [1] thru to **[16]**. By default all bars start playback at Step 1. Changing this setting in an Active Bar changes the Start Step number for that bar only.

Bar Length: [1] thru to **[16]**. An individual bar may have any set length between 1 and 16 steps.

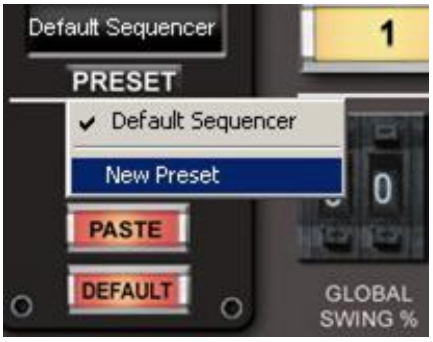
Pattern Management – Copy/Paste/Default/Preset/ Save

Copy and Paste: Any individual bar settings may be copied to another. Select the bar you wish to copy **from** with the mouse and click **[Copy]**. Now select the bar you wish to copy **to** and click **[Paste]**.

Default: Click this button to return any selected bar to its default setting.

Preset: Clicking this button opens a new window that lets you:-

(d) Load the **Default** Transport-Sequencer Pattern.
(e) Load a previously created and saved Transport-Sequencer Pattern.
(f) Create a **[New Preset]** Transport-Sequencer Pattern.



Selecting **[New Preset]** brings up a new window:-

Options here are as follows:-

(d) **[Current Settings]** – This creates a new Transport-Sequencer Preset with all the current edits and settings.
(e) **[Init Settings]** – This creates a new Transport-Sequencer Preset with Default settings.
(f) **[Cancel]** – This takes you back to the Main screen without creating a new Transport-Sequencer Preset.

Name: Clicking on the **[Name]** tab lets you edit the new Transport-Sequence name.

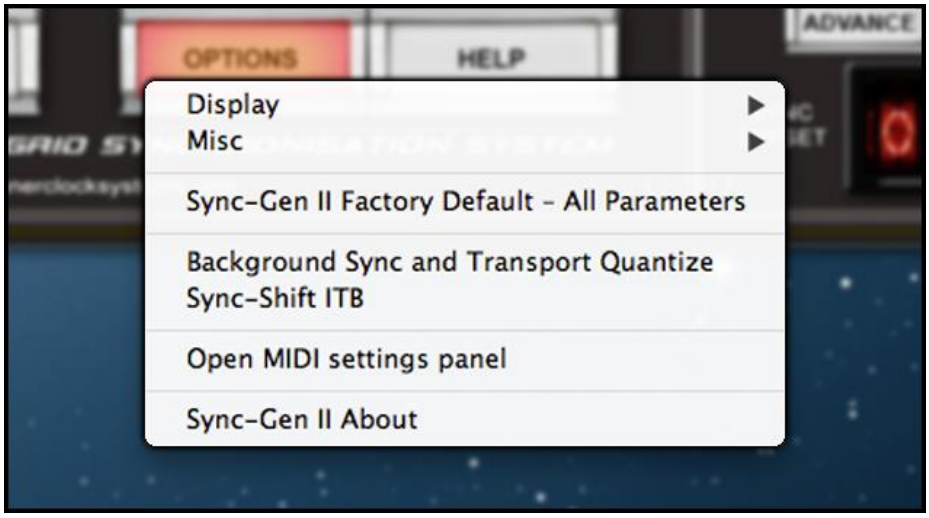
Save: This button saves the new Transport-Sequence and Name into the Preset List.

Options, Manual Control and Sync-Offset

Manual Start: Clicking this tab manually Starts and/or Re-Starts **Sync-Gen II** regardless of DAW running status. Quantize and MIDI Assignment options are available for this feature.

Manual Stop: Clicking this tab Stops **Sync-Gen II** regardless of DAW running status. Quantize and MIDI Assignment options are available for this feature.

Options: Clicking the **[Options]** tab opens a drop down menu that shows the following:-



Display

(a) PopUp On

When ticked/active and the mouse is clicked over any adjustable parameter the corresponding values and name (if set) are shown on screen.

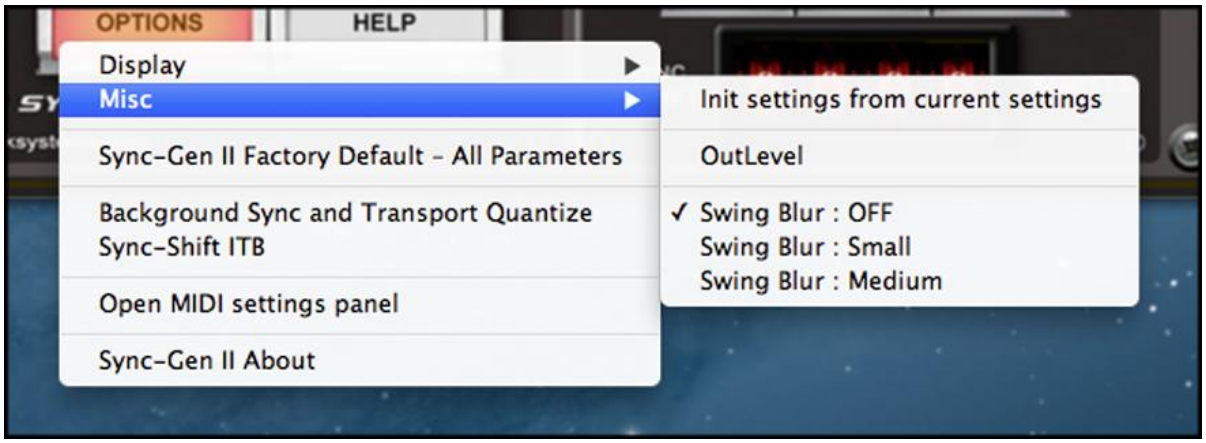
(b) PopUp Name On

When ticked/active the PopUp shows the full name of the selected parameter as well as the corresponding value.

(c) GUI Update: [Low, Mid, Fast]

This sets how rapidly the **Sync-Gen II** screen interface refreshes.

Misc



(a) Init settings from current settings:-

Clicking the mouse in this field resets **Sync-Gen II**.

(b) Out Level

Clicking on this tab opens a new window that shows the following:-

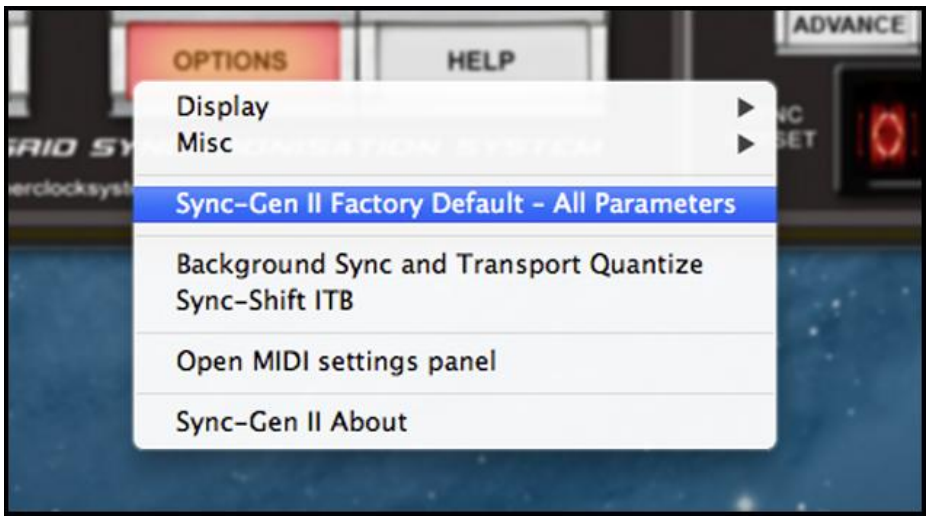
- **Output Level Settings: [1-16]**

These two parameters set the master output level for the Sync Pulses **[Left]** and Transport Pulses **[Right]** of **Sync-Gen II**. Default settings are **[Left-06]** and **[Right-06]**.

(c) Swing Blur: [Off, Small, Medium]

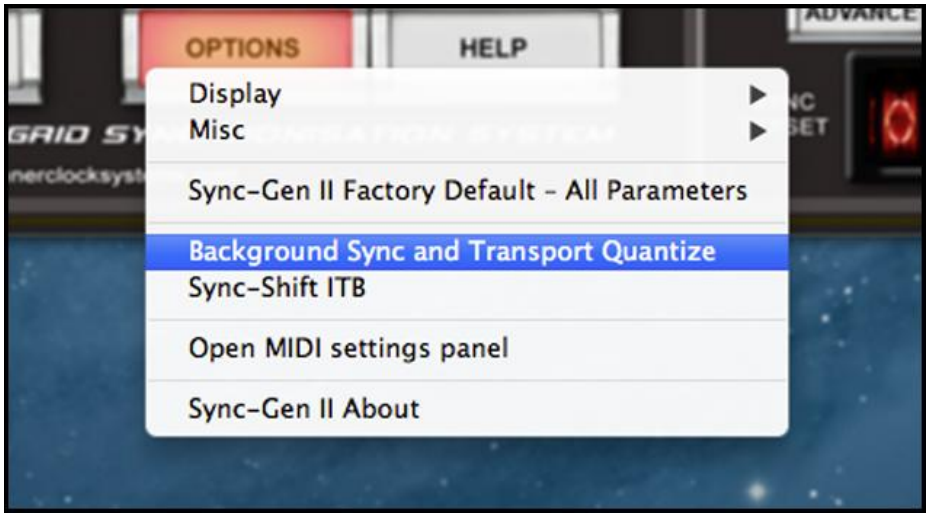
When set to **[Off]** any swung pulses within a bar are exactly the same in terms of rhythmic timing. When set to **[Small]** each second set of swung pulses has a small degree of random push or pull applied to the timing of the sync pulses. Because the initial and subsequent odd pairs of pulses are still grid-accurate, the overall resulting feel is very tight against the DAW audio playback but the subtle movement in the even pairs makes for a more natural swing. A setting of **[Medium]** is more pronounced.

Sync-Gen II Factory Default – All Parameters



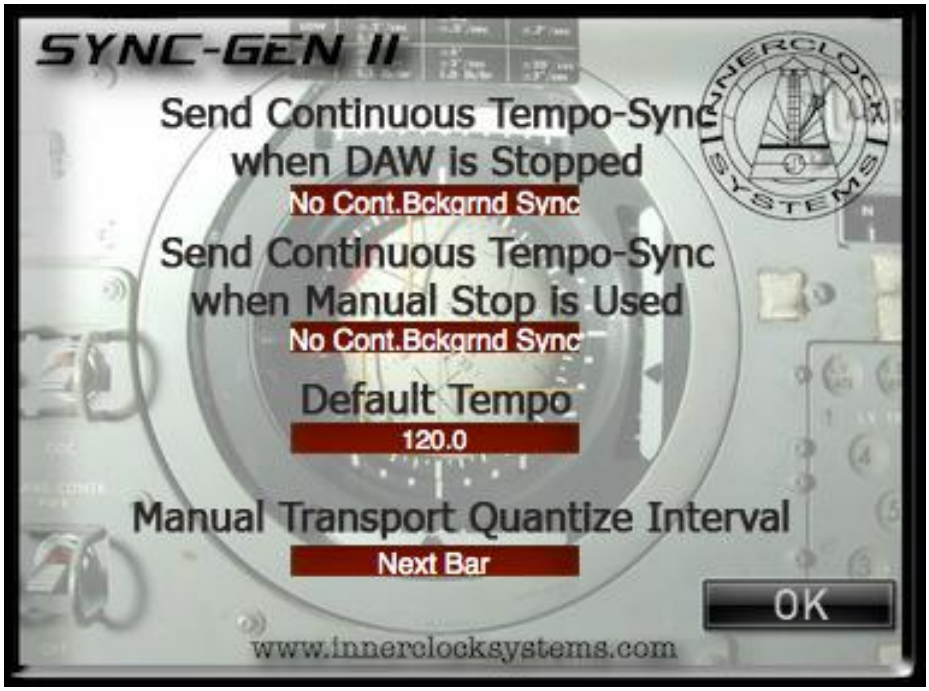
Selecting this Menu Option allows you to return **Sync-Gen II** to a Factory Default state.

Background Sync and Transport Quantize



Selecting this Menu Option provides settings that control how **Sync-Gen II** handles background Tempo-Sync generation and the Manual Stop/Restart Quantize Intervals.

NB: This new feature is DAW specific depending on how Plug-Ins are called or initiated by the Host Application. Please email us if you have any questions about using this on your particular setup.



Send Continuous Tempo-Sync when DAW is Stopped.

(a) No Continuous Background Sync: When the DAW is Stopped, **Sync-Gen II** does not generate continuous background Tempo-Sync

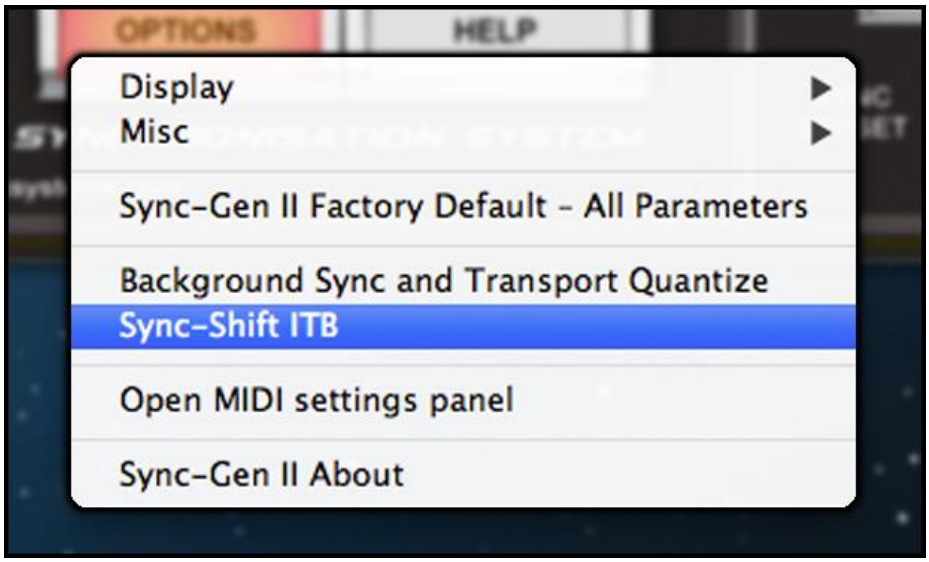
(b) Follow Tempo: When the DAW is Stopped, **Sync-Gen II** generates continuous background Tempo-Sync at the same Tempo as the Host Project.

(c) Fixed Tempo: When the DAW is Stopped, **Sync-Gen II** generates continuous background Tempo-Sync at the Tempo as set in this window.

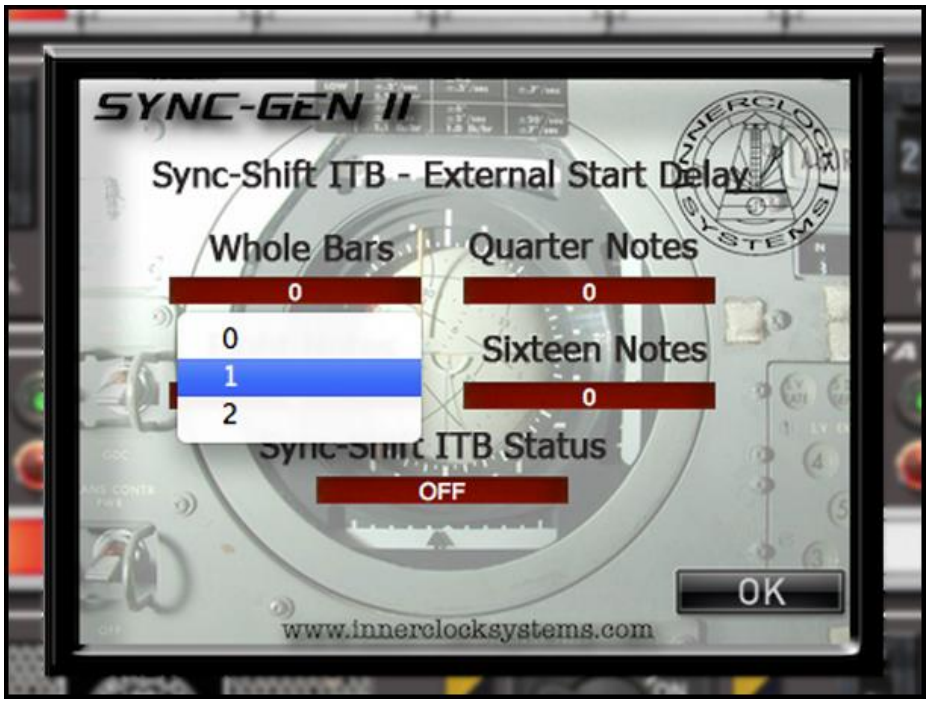
Manual Transport Quantize Interval

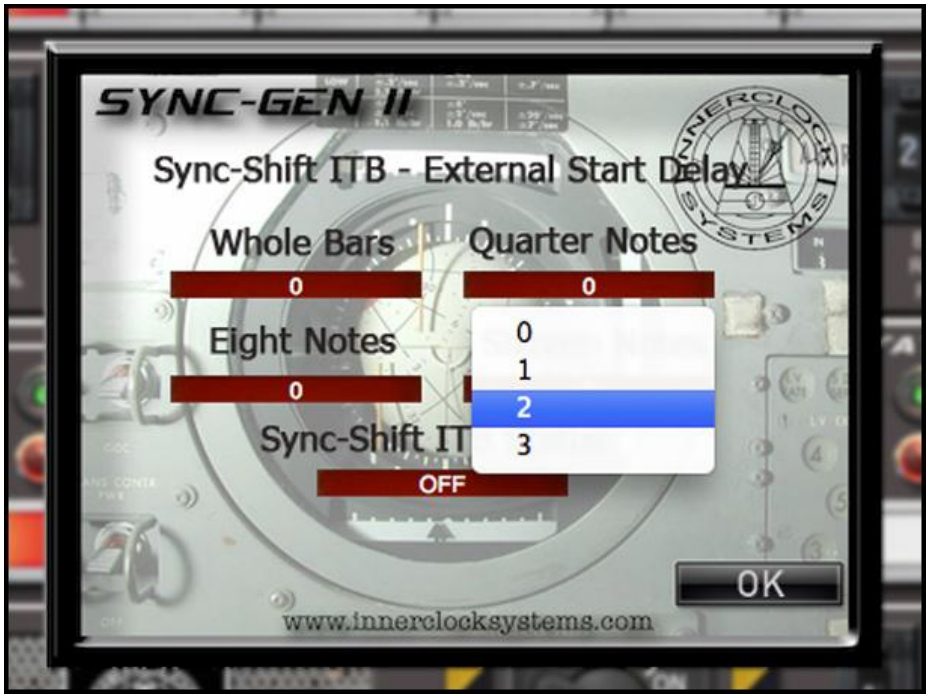
Clicking the mouse in this field you may can select either [Next Bar] or [Next ½ Bar]. This sets the quantize value for the **[Manual Start]** and **[Manual Stop]** buttons on the front GUI panel.

Sync-Shift ITB



Selecting the new **Sync-Shift ITB** Option Menu provides settings that allow you to delay the Start Position of **Sync-Gen II** relative to the DAW Tempo-Grid in precise rhythmic divisions. This unique feature allows you to set a full two bars start delay for your external tempo-sync hardware if you wish to give your DAW project a traditional 'count-in' period when tracking externally sequenced audio. Applying more complex combinations of offset values also allows for further creative external hardware syncopation by delaying the external start in rhythmically interesting ways. Simply select the values in the division windows to give the desired start offset interval and click **[OK]**.



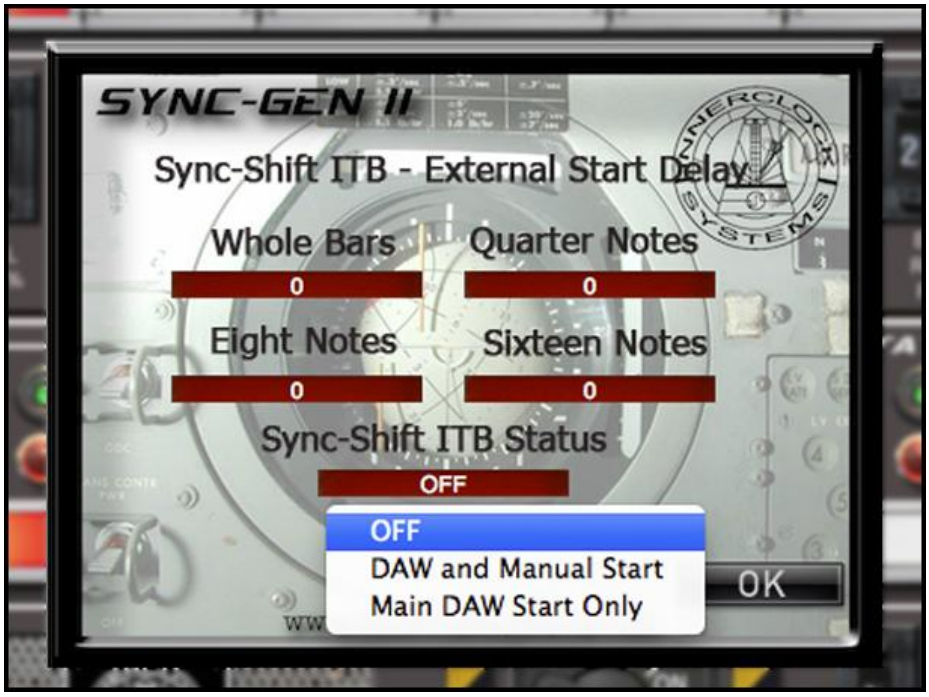


Sync-Shift ITB Status

(a) [**OFF**]: No Sync-Gen II Start Offset

(b) [**DAW and Manual Starts**]: Sync-Shift ITB Start Offset value is applied to **Sync-Gen II** on Initial DAW Start and all subsequent Manual Starts.

(c) [**Main DAW Start Only**]: Sync-Shift ITB Start Offset value is applied ONLY to **Sync-Gen II** on Initial DAW Start. All subsequent Manual Starts and not affected.



Midi Panel Settings

All parameters inside **Sync-Gen II** may be assigned a Midi Controller.

Clicking on this tab opens a new window that shows the following:-

Click on the **[Parameters]** Tab and select any parameter you wish to control remotely. Next click the **[Learning]** button so that it is lit green **[Active]** and then press or turn your Midi Controller or Midi Key to assign it to that parameter. Click **[OK]** to return to the main screen.

Sync-Offset

Clicking the mouse in numerical field you may enter a value up to a maximum of 4096. This is the number of samples Sync-Gen II may be 'pushed' **[Advance]** or 'dragged' **[Delay]** against the DAW Tempo-Grid. Select **[Bypass]** when no Sync-Offset is required. Use this in a live performance situation to time-align slow-starting external hardware with your DAW Audio playback or in a studio recording environment to compensate for native CPU and soundcard driver input processing latency.

Thanks: To all our supporters and customers for your positivity and enthusiasm for all that we do.

To our customers past and present: DAWs will change over time of course and there may be things we missed in all our strivings to build Sync-Gen II. After nearly two years of code crunching and scope analysis and beta testing over many continents we have a very good grasp on the workings of our software and how it integrates with all the host applications. If something seems odd, if you think something could be done better or simpler, or if you feel a new feature might make Sync-Gen II a better system – please let us know.

Respect to you for knowing the difference and to the original Friend-Chip GmbH Berlin team, Garfield Electronics USA and Roger Nichols (RIP) for blazing the sync-trail back in the day.

Design: David Lackey and Warren McAlister for **Innerclock Systems Pty Ltd**

Code: **Xavier Oudin** for **Xils Lab.**

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