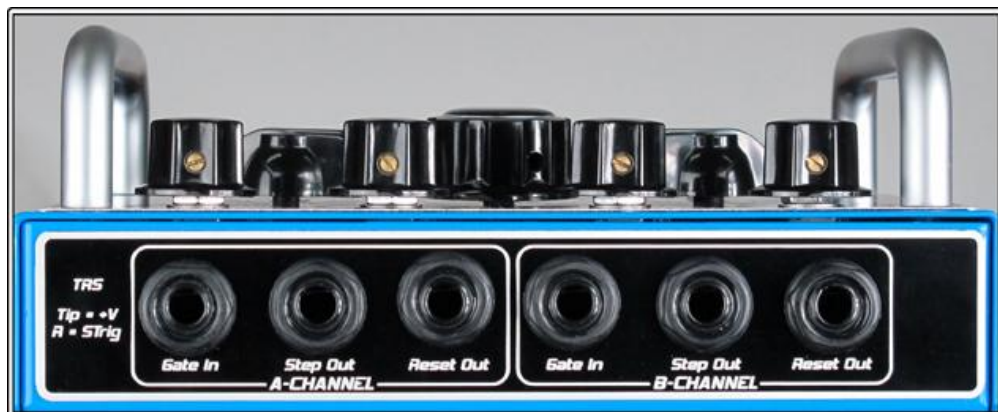




Operation Manual – April 2012

The **Sync-Step** is a Dual Channel Tempo-Sync to Voltage Pulse converter that has a number of unique functions.

1. Midi Clock to Rhythmic Voltage Pulse Conversion
2. Din-Sync to Rhythmic Voltage Pulse Conversion
3. Midi Clock to Rhythmic S-Trig Conversion (early Moog/Korg/Yamaha)
4. Din-Sync to Rhythmic S-Trig Conversion (early Moog/Korg/Yamaha)
5. Quantized Interval Switching for accurate Master-Slave Tempo-Sync
6. Independent Voltage Gate Inputs – A and B Channels
7. Midi Clock to Din-Sync conversion and Din-Sync to Midi Clock Conversion



Power

The **Sync-Step** requires a DC Power Supply (Negative Tip) – Minimum 9V up to a Maximum of 24V.

Tempo-Sync Source

The **Sync-Step** can synchronise to either Midi Clock or Din-Sync. Use the centre knob to select as required. Selecting **[OFF]** puts the **Sync-Step** in Bypass.

Connection for Din-Sync as Master Tempo Source



Connection for Midi Clock as Master Tempo Source



Voltage Pulses

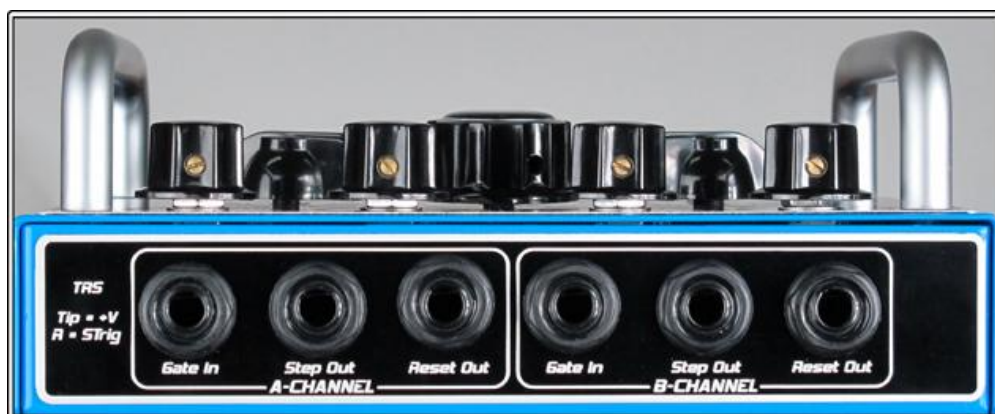
The **Sync-Step** generates positive DC Voltage Pulses which can be used to drive many different devices in perfect rhythmic-sync with your Tempo Master. Almost all vintage synthesizers have either a Trigger or Gate Input that require a Voltage Pulse to generate sound. Many new analogue synthesizers and modular systems also use triggers and gates in a wide variety of ways. Certain drum machine voices and percussion modules can be triggered and synchronised by voltage pulses and many vintage and contemporary step sequencers use voltage pulses to drive the sequencer tempo clock as well.

IMPORTANT INFORMATION

Please carefully check the specification of your particular synthesizer, drum module or step sequencer before connecting the **Sync-Step**. Since the early development of electronic musical instruments there have been many different voltage standards between manufacturers. 5 Volts DC is very common in more recent times but some early analogue devices used 15 Volts DC to trigger EGs and VCAs. The **Sync-Step** output voltage ranges from Zero to +15 VDC in order to accommodate as many devices as possible. If you are uncertain of the specification of your device be sure to set the [VOLTS] rotary knobs to zero [Anti Clockwise] and then gradually increase the voltage amount until you get a positive trigger. Alternatively email us and we will find out for you. Applying too much juice to your vintage treasures may result in tears so take the time to check first.

The Front

Looking at the front of your **Sync-Step** you will see it is separated into two halves – **Channel A** and **Channel B**. The function of both of these channels is identical so let's look at getting some rhythmic voltage pulses from **Channel A**.



The [Step Out] and [Reset Out] sockets are Stereo (TRS or Tip/Ring/Sleeve) in order to conserve space. In your **Sync-Step** package you will have located four TRS-Dual Mono Y-Split Cables. The [Step Out] and [Reset Out] sockets on the **Sync-Step** provide both Positive DC Voltage Pulses using the [Tip] output and S-Trig Pulses using the [Ring] output of the Y-Split Cable. For this first example we will be looking at using Positive DC Voltage Pulses.

Plug one of the supplied Y-Split Cables into **Channel A Step Out**. Next, connect the **[Tip]** output to your hardware device Trigger or Gate Input. Before pressing play on your master Sequencer or Drum Machine make sure the **[Voltage]** control is set to **[Zero]** and the **[Pulse Width]** control is set to **[20ms]** on the **Channel A** controls.



Now press play on your Master Sequencer or Drum Machine. If you have connected a Din-Sync device as Tempo-Sync Master you will see the Green LED nearest the Din-Sync Input flash in time with the Master Tempo along with the Centre LED indicating the **Sync-Step** is active and is generating voltage pulses. Alternatively, if you have connected a Midi Clock device as Tempo-Sync Master you will see the Green LED nearest the Midi Clock Input flash in time with the Master Tempo along with the Centre LED indicating the **Sync-Step** is active and is generating voltage pulses in the same way.

Now, gradually increase the **Channel A [Voltage]** control to an amount that suits your particular hardware device. If you are triggering a synthesizer VCA, Envelope Generator or a Drum module you should now hear it play in rhythmic time as set by the main **Channel A Rotary Interval Switch** against the Tempo Master.

If you are using your **Sync-Step** to clock a Step Sequencer make sure the Step Sequencer is advancing in time with your Tempo Master.

If you are clocking an analogue synthesizer arpeggiator, hold some notes down and listen to the notes playing in time with your Master Tempo device too. Try experimenting with different rhythmic intervals to get a feel for how they sound.

The Rotary Interval Switch changes are quantized to the Bar so wait to hear the changes you select. This also keeps the Pulses in perfect rhythmic time with the Tempo Master no matter when intervals are selected.

S-Trig

Some vintage synthesizers and sequencers – Moog, Yamaha and Korg in particular - used Shorting Triggers or S-Trigs to drive VCAs, Envelope Generators and Step Sequencers. Unlike DC Voltage Pulses, S-Trig is simply the signal being shorted to ground. The **Sync-Step** provides a convenient way to rhythmically trigger and clock these vintage instruments too.

Using the same Y-Split cables connected to Channel **A Step Out**, this time connect the **[Ring]** output to your hardware device S-Trig Input. Before pressing play on your master Sequencer or Drum Machine make sure the **[Voltage]** control is set to **[Zero]** and the **[Pulse Width]** control is set to **[20ms]** on the **Channel A** controls.



Now press play on your Master Sequencer or Drum Machine. If you have connected a Din-Sync device as Tempo-Sync Master you will see the Green LED nearest the Din-Sync Input flash in time with the Master Tempo along with the Centre LED indicating the **Sync-Step** is active and is generating voltage pulses. Alternatively, if you have connected a Midi Clock device as Tempo-Sync Master you will see the Green LED nearest the Midi Clock Input flash in time with the Master Tempo along with the Centre LED indicating the **Sync-Step** is active and is generating voltage pulses in the same way.

Now, gradually increase the **Channel A [Voltage]** control to an amount that suits your particular hardware device. If you are S-Trigging a synthesizer VCA, Envelope Generator or a Drum module you should now hear it play in rhythmic time as set by the main **Channel A Rotary Interval Switch** against the Tempo Master.

If you are using your **Sync-Step** to clock an S-Trig enabled Step Sequencer make sure the Step Sequencer is advancing in time with your Tempo Master.

If you are clocking an S-Trig enabled analogue synthesizer arpeggiator, hold some notes down and listen to the notes playing in time with your Master Tempo device too. Try experimenting with different rhythmic intervals to get a feel for how they sound.

The Rotary Interval Switch changes are quantized to the Bar so wait to hear the changes you select. This also keeps the Pulses in perfect rhythmic time with the Tempo Master no matter when intervals are selected.

NB: Both the Positive DC Voltage and S-Trig outputs can be used simultaneously.

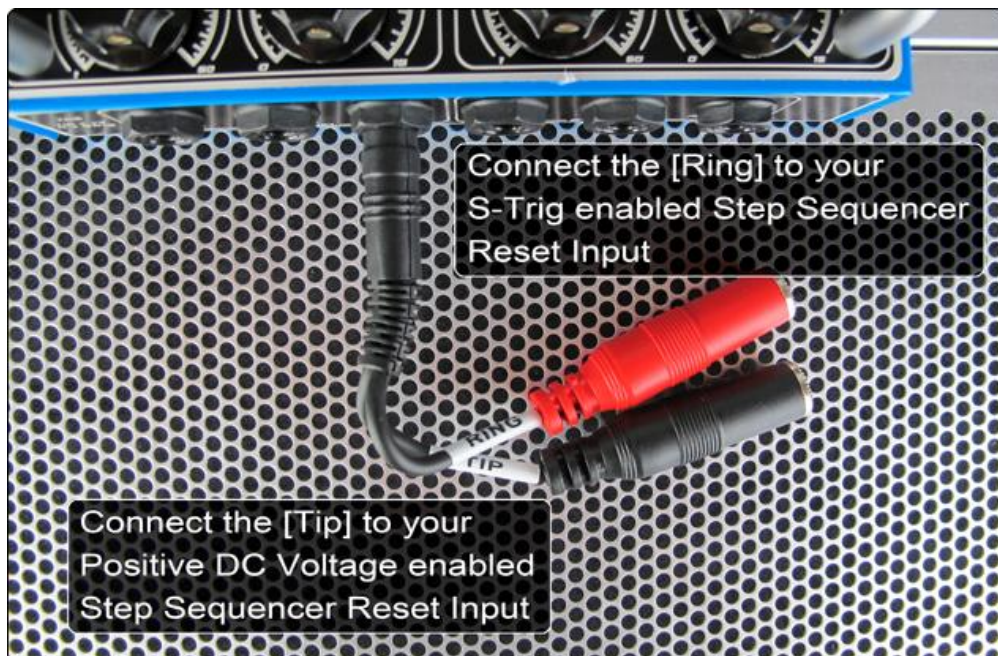
NB: Voltage setting has no effect on the Step S-Trig output.

Reset

Many external hardware Step Sequencers have a Reset Input.

This feature allows you to force the Step Sequencer to Reset playback to Step 1 when a trigger is applied to the Reset Input jack.

If you have such a device plug a second Y-Split Cable into **Channel A Reset Out**. Next, connect the **[Tip]** output to your Step Sequencer Reset Input. (If your device uses S-Trig then use the **[Ring]** output instead.) The panel settings for **[Voltage]** and **[Pulse Width]** apply to the Reset Pulse output also.



Press play as before on your Master Sequencer or Drum Machine and after a few bars press Stop and you will see that your external Step Sequencer has automatically reset to Step 1 ready to play again.

NB: Both the Positive DC Voltage and S-Trig outputs can be used simultaneously.

NB: Voltage setting has no effect on the Reset S-Trig output.

Gate In – Advanced Use

Both A and B Channels of the **Sync-Step** feature a **[Gate-In]** Socket. This is a Mono/TS (Tip/Sleeve) socket designed to accept a Positive (+) 5 Volt DC signal. It is Normalled which means correct **Sync-Step** operation is achieved with nothing plugged in. If you do plug a cable into this socket it will override the Normalled Operation and that channel will ONLY output rhythmic pulses when a Voltage Pulse is applied to the **[Gate In]**. This allows you to 'Play' or 'Stutter' the **Sync-Step** Outputs in real-time for performance applications. You can do this live from a CV/Gate Keyboard or alternatively send it Gate Pulses from a Sequencer or any other Analogue Module that produces (+) 5 Volt DC Pulses too.



Variable Pulse Width – Advanced Use

The **Sync-Step** allows you to vary the Pulse Width of the Voltage Pulses from very short - 1ms - up to 50ms. Many triggered drum modules follow Trigger Pulse Width so experimenting with the **Sync-Step** PW control allows for interesting length modulation. Hi-Hats can be made to sound very short/tight or long/open as a basic example. Synthesizer VCA's and Envelope Generators may also follow Trigger Pulse Width and you can use a combination of extended PW from the **Sync-Step** to create an 'Attack-Hold' effect which gives more punch and dynamics to the attack portion of your synthesizer patch.

Midi Clock Thru and Midi Clock to Din-Sync Conversion

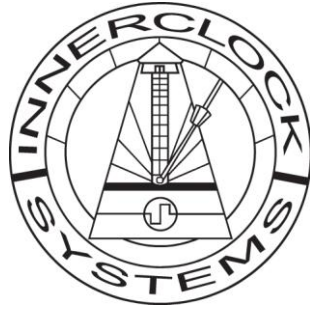
The **Sync-Step** has a passive Midi Clock Thru Port so you can daisy chain other Midi Clock slave devices when necessary. The **Sync-Step** also has a dedicated, low-latency and zero jitter Midi Clock to Din Sync conversion engine built inside. If your Master Tempo sequencer or Drum Machine uses Midi Clock then the **Sync-Step** will automatically convert and re-generate Din-Sync to accurately tempo-sync older Roland XOX units as required.



Din-Sync Thru and Din-Sync to Midi Clock Conversion

The **Sync-Step** has a passive Din-Sync Thru Port so you can daisy chain other Din-Sync slave devices when necessary. The **Sync-Step** also has a dedicated, low-latency and zero jitter Din-Sync to Midi Clock conversion engine built inside. If your Master Tempo sequencer or Drum Machine uses Din-Sync then the **Sync-Step** will automatically convert and re-generate Midi Clock to accurately tempo-sync any Midi Clock enabled sequencer or drum machine as required.





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

Conceived, Manufactured and Tested in Australia.

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

www.innerclocksystems.com