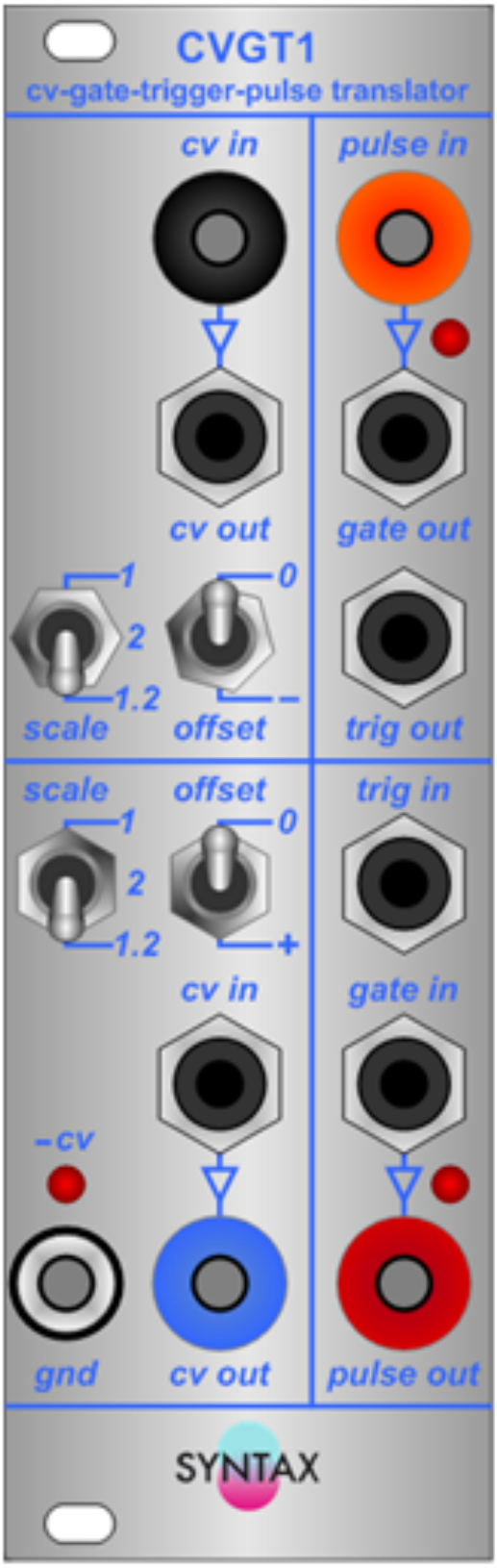
SYNTAX CVGT1



User Manual

Introduction

Thank you for purchasing the SYNTAX CVGT1 Module. This manual explains what the CVGT1 Module is and how it works. This module has exactly the same specification as the original Synovatron CVGT1.

The CVGT1 Module is an 8HP (40mm) wide Eurorack analogue synthesizer module and is compatible with the Doepfer™ A-100 modular synthesizer bus standard.

CVGT1 (Control Voltage Gate Trigger module 1) is a CV and Gate/Trigger interface primarily aimed at providing a means of exchanging CV and timing pulse control signals between Eurorack synthesizer modules and Buchla™ 200e Series although it will also work with other banana socketed synths such as Serge™ and Bugbrand™.

Caution

Please ensure you use the CVGT1 Module in accordance with these instructions especially taking great care to connect the ribbon cable to the module and the power bus correctly. Always double check!

Only fit and remove modules with the **rack power off and disconnected from the mains electricity supply** for your own safety.

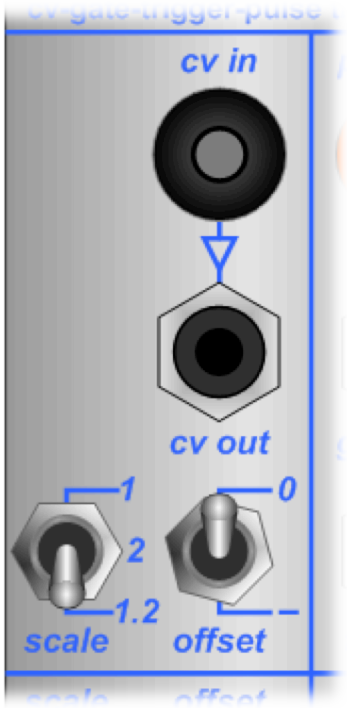
Refer to the connection section for ribbon cable connection instructions. PostModular Limited (SYNTAX) cannot be held responsible for any damage or harm caused through incorrect or unsafe use of this module. If in doubt, stop and check.

CVGT1 Description

The CVGT1 Module has four channels, two for CV signal translation and two for timing signal translation as follows:-

Banana to Euro CV Translation - Black Channel

This is a precision DC coupled buffered attenuator designed to translate input signals in the range of 0V to +10V to an output compatible with the ±10V bipolar range of Eurorack synthesizers.



cv in A 4mm banana socket input with a range of 0V to +10V (Buchla™ compatible).

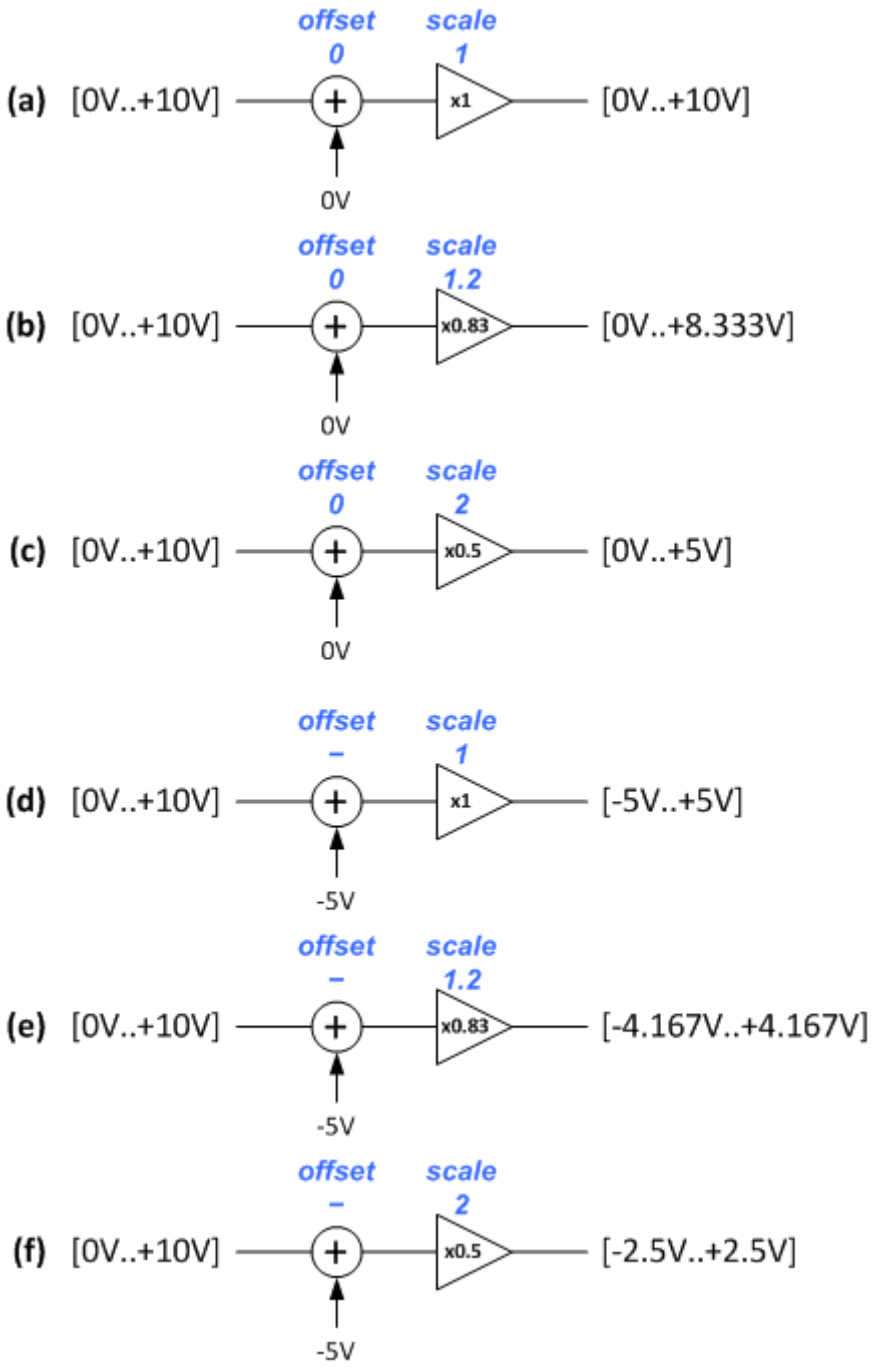
cv out A 3.5mm jack socket output (Eurorack compatible).

scale This switch allows the gain to be changed to match the scale factor of the ***cv in*** input signal. This can be set to deal with ***1***V/octave, ***1.2***V/octave and ***2***V/octave input scales; in the ***1*** position the amplifier has a gain of 1 (unity), in the ***1.2*** position it has a gain of 1/1.2 (attenuation of 0.833) and in the ***2*** position it has a gain of 1/2 (attenuation of 0.5).

offset This switch adds an offset voltage to the input signal if required. In the (***0***) position the offset is unchanged; a positive going input signal (e.g. envelope) will result in a positive going output signal; In the (**–**) position -5V is added to the input signal which can be used to shift a positive going input signal down by 5V. The offset level will be affected by the ***scale*** switch setting.

The simplified schematics (a) to (f) explain in simple arithmetic terms how an input signal in the range of 0V to +10V is translated using the various ***offset*** and ***scale*** switch positions.

Schematics (a) to (c) show the ***offset*** switch in the ***0*** position for each of the three ***scale*** positions. Schematics (d) to (f) show the ***offset*** switch in the **–** position for each of the three ***scale*** positions.



*Note that when the **scale** switch is in the **1** position and the **offset** switch is in the **0** position, as shown in schematic (a), the signal is not changed. This is useful for interfacing banana connector synthesizers that have 1V/octave scaling e.g. Bugbrand™ to Eurorack synthesizers.*

Euro to Banana CV Translation – Blue Channel

This is a precision DC coupled amplifier designed to translate bipolar input signals from Eurorack synthesizers into a 0V to +10V range.

cv in A 3.5mm jack socket input from a Eurorack synthesizer

cv out A 4mm banana socket output with an output range of 0V to +10V (Buchla™ compatible).

scale This switch allows the gain to be changed to match the scale factor of the synthesizer connected to ***cv out***. This can be set for ***1***V/octave, ***1.2***V/octave and ***2***V/octave scales; in the ***1*** position the amplifier has a gain of 1 (unity), in the ***1.2*** position it has a gain of 1.2 and in the ***2*** position it has a gain of 2.

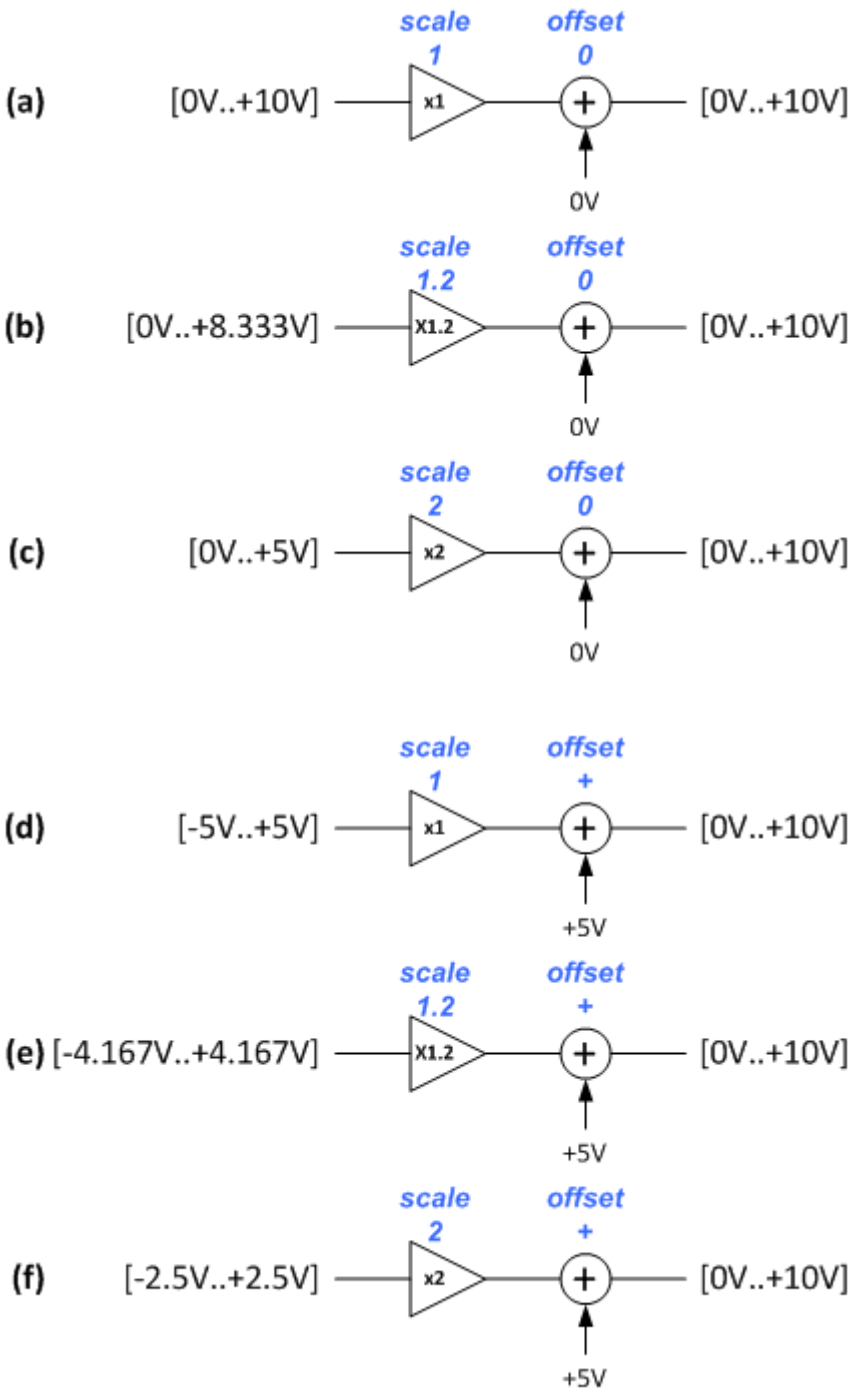
offset This switch adds an offset to the output signal. In the ***0*** position the offset is unchanged; a positive going input signal (e.g. envelope) will result in a positive going output. In the (**+**) position 5V is added to the output signal which can be used to shift a negative going input signal up by 5V. The offset level will be unaffected by the ***scale*** switch setting.

–CV LED indicator lights if the output signal goes negative to warn that the signal is outside the useful range of a 0V to +10V range synthesizer.

gnd A 4mm banana ground socket. This is used to provide a ground reference (signal return path) to another synthesizer if required. Just connect this to the banana socket ground (usually on the back) of the synth you want to use the CVGT1 with.

The simplified schematics (a) to (f) explain in simple arithmetic terms what input ranges are required to translate to an output range of 0V to +10V using the various ***offset*** and ***scale*** switch positions.

Schematics (a) to (c) show the ***offset*** switch in the ***0*** position for each of the three ***scale*** positions. Schematics (d) to (f) show the ***offset*** switch in the **+** position for each of the three ***scale*** positions.

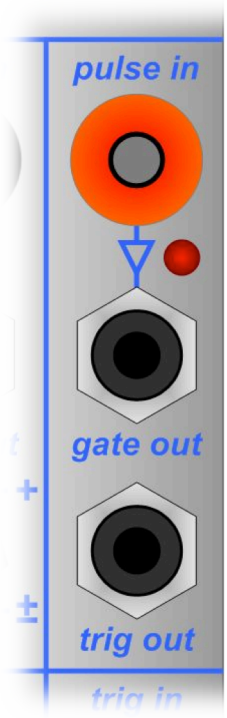


*Note that when the **scale** switch is in the **1** position and the **offset** switch is in the **0** position, as shown in schematic (a), the signal is not*

changed. This is useful for interfacing Eurorack synthesizers to banana connector synthesizers that have 1V/octave scaling e.g. Bugbrand™.

Banana to Euro Gate Trigger Translator – Orange Channel

This is a timing signal converter designed specifically to convert the tri-state timing pulse output from Buchla™ 225e and 222e synthesizer modules into Eurorack compatible gate and trigger signals. It will work with any signal that exceeds the input thresholds of either the gate or trigger detectors as follows.

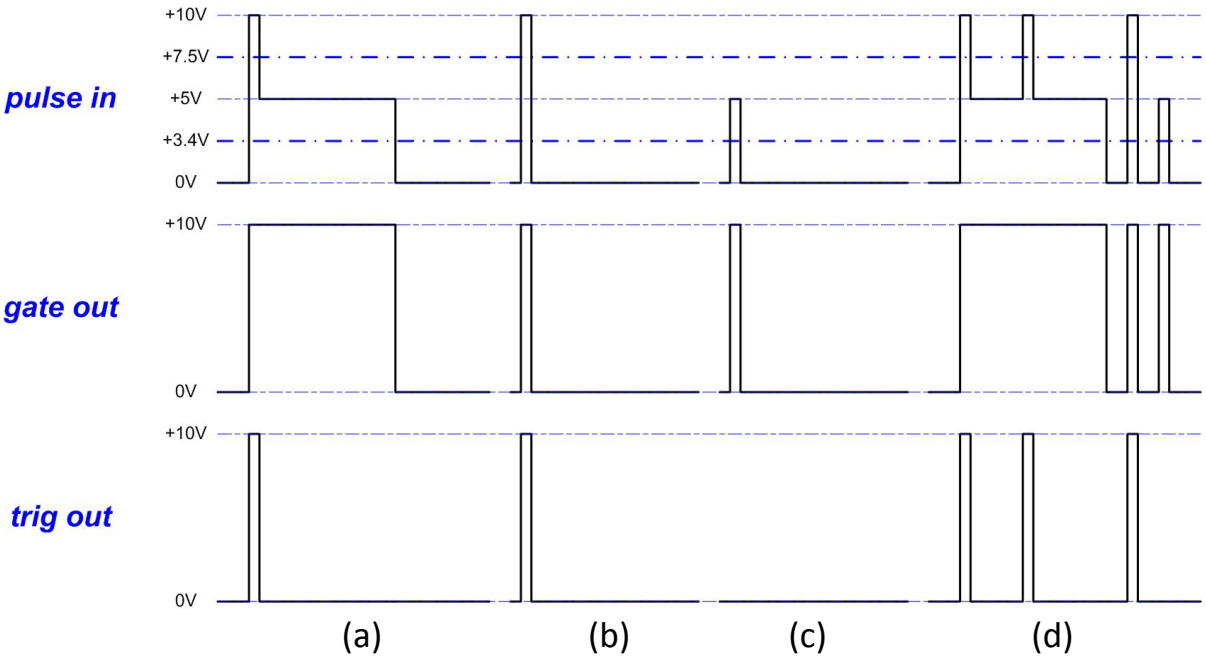


pulse in A 4mm banana socket input compatible with Buchla™ pulse outputs in the range of 0V to +15V.

gate out A 3.5mm jack socket Eurorack gate output. The output goes high (+10V) when the ***pulse in*** voltage is above +3.4V. This is used to follow the gate or sustain part of Buchla™ 225e and 222e module pulses although any signal exceeding +3.4V will cause this output to go high. Refer to the example timing diagram below. The LED illuminates when ***gate out*** is high.

trig out A 3.5mm jack socket Eurorack trigger output. The output goes high (+10V) when the ***pulse in*** voltage is above +7.5V. This is used to follow the initial trigger part of Buchla™ 225e and 222e module pulses although any signal exceeding +7.5V will cause this output to go high.

*Note that **trig out** does not shorten pulses it just transmits the high level pulses at the width presented to **pulse in** which are all narrow pulses on Buchla™ synth pulse outputs. Refer to the example timing diagram on the next page.*



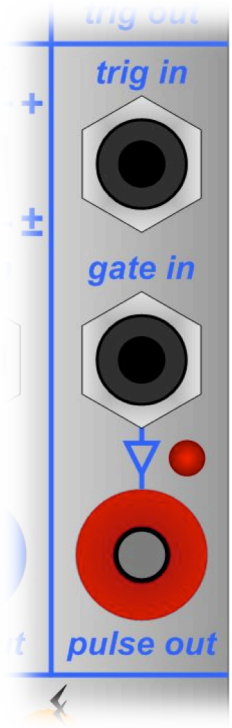
The timing diagram above shows four example ***pulse in*** input waveforms and the ***gate out*** and ***trig out*** responses. The input switching thresholds for the gate and trigger level detectors are shown at +3.4V and +7.5V.

The first example (a) shows the pulse shape similar to that of a Buchla™ 225e and 222e module pulses; an initial trigger pulse followed by a sustain level which is reflected in the ***gate out*** and ***trig out*** responses.

The other examples show that pulses are just passed through (at +10V) to ***gate out*** and ***trig out*** if they exceed respective thresholds. A signal that exceeds both thresholds will be present on both outputs.

Euro to Banana Gate Trigger Translator – Red Channel

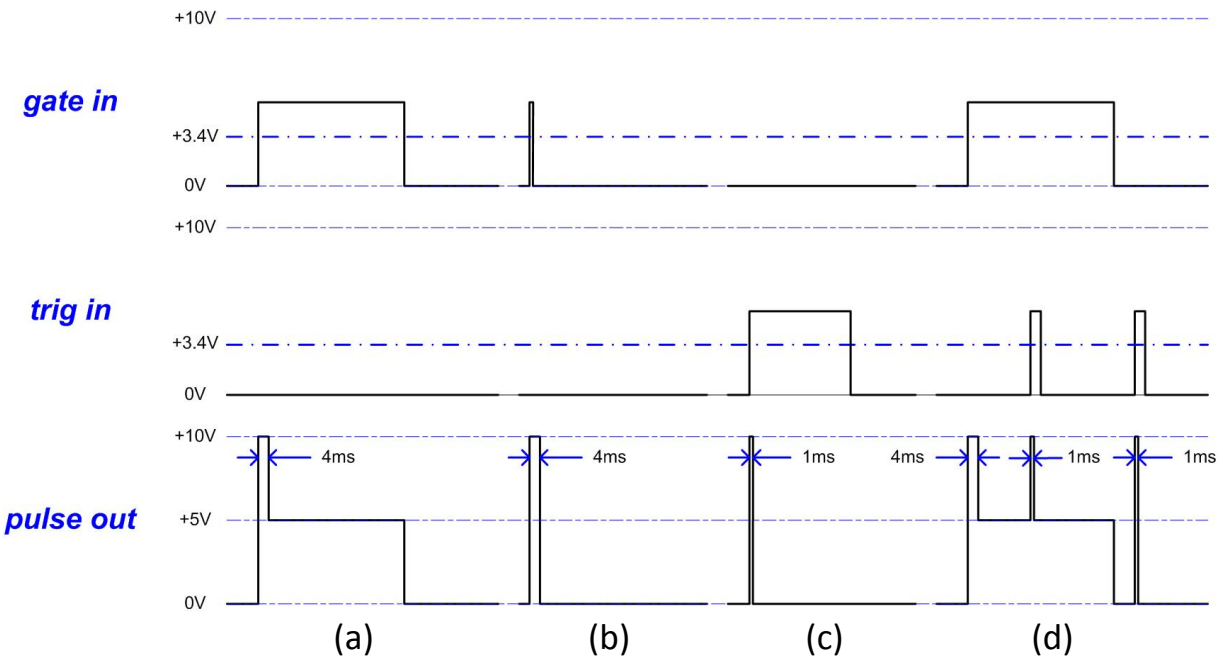
This is a timing signal converter designed to convert Eurorack gate and trigger signals into a timing pulse output compatible with a Buchla™ synthesizer modules pulse inputs.



trig in A 3.5mm jack socket trigger input from a Eurorack synthesizer. This can be any signal that exceeds the input threshold of +3.4V. It will generate a +10V narrow pulse (trimmer adjustable in the range 0.5ms to 5ms; factory set to 1ms) at ***pulse out*** irrespective of the input pulse width.

gate in A 3.5mm jack socket gate input from a Eurorack synthesizer. This can be any signal that exceeds the input threshold of +3.4V. This input is specifically designed to create an output at ***pulse out*** that is compatible with Buchla™ 225e and 222e module pulses i.e. it will cause a tri-state output pulse. The ***gate in*** leading edge will generate a +10V narrow trigger pulse (also trimmer adjustable in the range 0.5ms to 5ms; factory set to 4ms) at ***pulse out*** irrespective of the input pulse width. It will also generate a +5V sustaining 'gate' signal for the duration of the input pulse if it extends beyond the narrow trigger pulse. This can be seen in example (a) in the timing diagram on the next page.

pulse out A 4mm banana socket output compatible with Buchla™ synthesizer pulse inputs. It outputs a composite (an OR function) of the signals derived from the ***trig in*** and ***gate in*** pulse generators. The output has a diode in its path so it can simply be connected to other Buchla™ compatible pulses without signal contention. The LED illuminates when ***pulse out*** is high.



The timing diagram above shows four examples of ***gate in*** and ***trig in*** input waveforms and the ***pulse out*** responses. The input switching thresholds for the gate and trigger level detectors are shown at +3.4V.

The first example (a) shows how a Buchla™ 225e and 222e module compatible pulse is generated in response to a gate in signal; an initial 4ms trigger pulse followed by a sustain level lasting the length of the ***gate in*** signal.

Example (b) shows what happens when the ***gate in*** signal is short and just generates the initial 4ms trigger pulse without a sustaining level.

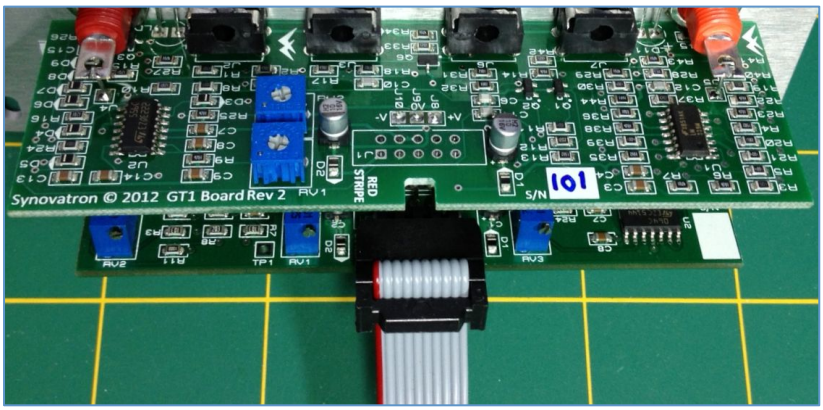
Example (c) shows what happens when the ***trig in*** signal is applied; the output is a 1ms trigger pulse triggered off the leading edge of the ***trig in*** signal and ignores the remainder of the ***trig in*** signal duration.

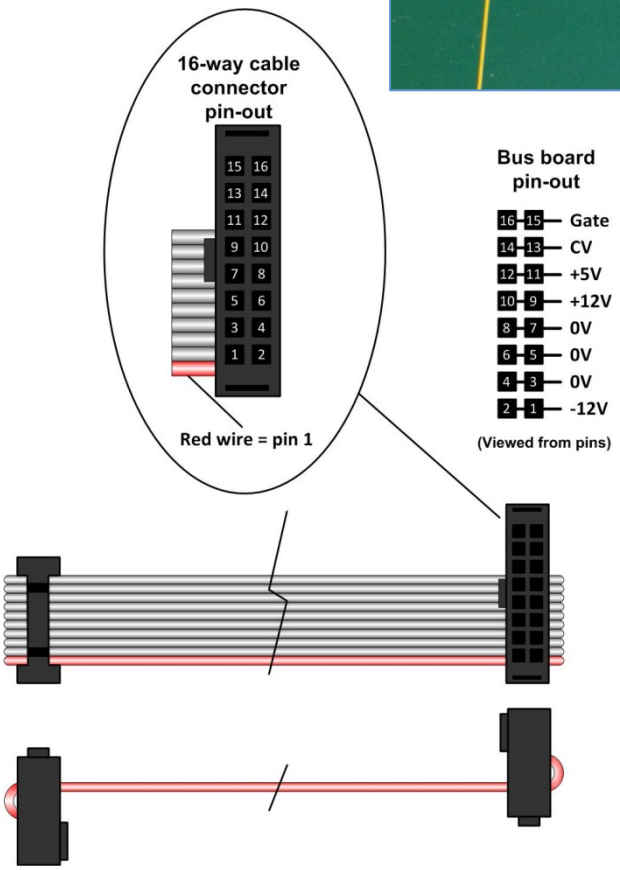
Example (d) shows what happens when a combination of ***gate in*** and ***trig in*** signals are present.

Connection Instructions

Ribbon Cable

The ribbon cable connection to the module (10-way) should always have the **red stripe** at the bottom to line up with the RED STRIPE marking on the CVGT1 Board. The same for the other end of the ribbon cable that connects to the modular synth rack's power connector (16-way). The **red stripe** must always go to the pin 1 or -12V position. Note that Gate, CV and +5V pins are not used. The +12V and -12V connections are diode protected on the CVGT1 module to prevent damage if reverse connected.





Adjustments

These adjustments should only be performed by a suitably qualified person.

CV scale and offset adjustments

The offset voltage reference and scale adjustment pots are on the CV1 board. These adjustments should be performed with the aid of an adjustable DC voltage source and a precision Digital Multi-Meter (DMM), with a basic accuracy of better than ±0.1%, and small screwdriver or trim tool.

RV2 **RV1** **RV3**

(1) Set the front panel switches as follows:-

Black socket channel: **scale** to **1.2**
Black socket channel: **offset** to **0**
Blue socket channel: **scale** to **1.2**
Blue socket channel: **offset** to **0**

(2) **Black** socket channel: Measure **cv out** with a DMM and with no input applied to **cv in** - record the value of the residual offset voltage reading.

(3) **Black** socket channel: Apply **6.000V** to **cv in** - this should be checked with the DMM.

(4) **Black** socket channel: Measure **cv out** with a DMM and adjust **RV3** for a reading of **5.000V** above the value recorded in step 2.

(5) **Black** socket channel: Set **offset** to **–**.

(6) **Black** socket channel: Measure **cv out** with a DMM and adjust **RV1** for **833mV** above the value recorded in step 2.

(7) **Blue** socket channel: Measure **cv out** with a DMM and with no input applied to **cv in** - record the value of the residual offset voltage reading.

(8) **Blue** socket channel: Apply **8.333V** to **cv in** - this should be checked with the DMM.

(9) **Blue** socket channel: Measure **cv out** with a DMM and adjust **RV2** for **10.000V** above the value recorded in step 7

*Note there is only one scale control for **black** socket channel and one for **blue** socket channel so the adjustments are optimised for a scale of 1.2. However due to the use of high precision components used the other scale positions will track the 1.2 setting to within 0.1%. Similarly the offset reference voltage adjustment is shared between both channels.*

Pulse timing adjustments

The pulse timing adjustment pots are on the GT1 board. The adjustments should be performed with the aid of a clock or repeating gate source, an oscilloscope and a small screwdriver or trim tool.

The widths of the pulses produced at **pulse out** from **gate in** and **trig in** are factory set to a **gate in** leading pulse width of 4ms (RV1) and **trig in** pulse width of 1ms (RV2). These can however be set anywhere from 0.5ms to over 5ms.

CVGT1 Specification

Banana to Euro CV - Black Channel

Input: 4mm banana socket ***cv in***
Input range: ±10V
Input impedance: 1MΩ
Bandwidth: DC-19kHz (-3db)
Gain: 1.000 (***1***), 0.833 (***1.2***), 0.500 (***2***) ±0.1% max
Output: 3.5mm jack ***cv out***
Output range: ±10V
Output impedance: <1Ω

Euro to Banana CV – Blue Channel

Input: 3.5mm jack ***cv in***
Input range: ±10V
Input impedance: 1MΩ
Bandwidth: DC-19kHz (-3db)
Gain: 1.000 (***1***), 1.200 (***1.2***), 2.000 (***2***) ±0.1% max
Output: 4mm banana socket ***cv out***
Output impedance: <1Ω
Output range: ±10V
Output indication: Red LED for negative outputs ***-cv***

Banana to Euro Gate Trigger – Orange Channel

Input: 4mm banana socket ***pulse in***
Input impedance: 82kΩ
Input threshold: +3.4V (gate), +7.5V (trigger)
Gate output: 3.5mm jack ***gate out***
Gate output level: gate off 0V, gate on +10V
Trigger output: 3.5mm jack ***trig out***
Trigger output level: trigger off 0V, trigger on +10V
Output indication: Red LED is on for duration of ***pulse in***

Euro to Banana Gate Trigger – Red Channel

Gate input: 3.5mm jack ***gate in***
Gate input impedance: 94kΩ
Gate input threshold: +3.4V
Trigger input: 3.5mm jack ***trig in***
Trigger input impedance: 94kΩ
Trigger input threshold: +3.4V
Output: 4mm banana socket ***pulse out***
Output level:

- **Gate initiated:** gate off 0V, gate on +10V initially (0.5ms to 5ms) falling to +5V for duration of ***gate in***. Only the leading edge of the ***gate in*** signal initiates the timer. The pulse duration (0.5ms to 5ms) is set by a trimmer (factory set to 4ms).
- **Trigger initiated:** trigger off 0V, trigger on +10V (0.5ms to 5ms) initiated by ***trig in***. Only the leading edge of the ***trig in*** signal initiates the timer. The pulse duration (0.5ms to 5ms) is set by a trimmer.
- **Pulse output:** The gate and trigger initiated signals are OR'ed together using diodes. This allows other modules with diode connected outputs to also be OR'd with this signal.

Output indication: Red LED is on for the duration of ***pulse out***

Please note that PostModular Limited reserves the right to change the specification without notice.

General

Dimensions

3U x 8HP (128.5mm x 40.3mm); PCB depth 33mm, 46mm at ribbon connector

Power consumption

+12V @ 20mA max, -12V @ 10mA max, +5V is not used

A-100 Bus utilisation

±12V and 0V only; +5V, CV and Gate are not used

Contents

CVGT1 Module, 250mm 10 to 16-way ribbon cable, 2 sets of M3x8mm Pozidrive screws, and nylon washers

Environmental

RoHS

All components used on the CVGT1 Module are RoHS compliant. To comply with the WEEE Directive please do not discard into landfill – please recycle all **W**aste **E**lectrical and **E**lectronic **E**quipment responsibly – please contact PostModular Limited to return the CVGT1 Module for disposal if required.

Warranty

The CVGT1 Module is guaranteed against defective parts and workmanship for 12 months from date of purchase. Note that any physical or electrical damage due to misuse or incorrect connection invalidates the warranty.

Quality

The CVGT1 Module is a high quality professional analogue device that was lovingly and carefully designed, built, tested in the United Kingdom by PostModular Limited. Please be assured of my commitment to providing good reliable and usable equipment! Any suggestions for improvements will be gratefully received.

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