FREQUENCY DIVIDER

÷1 ÷1.5 ÷2 ÷3 ÷4 ÷8 ÷16 ÷32 ÷64 ÷128
÷256 ÷512 ÷1024 ÷2048 ÷4096

BLACET RESEARCH MODEL 2020
Frequency Divider

Users Manual
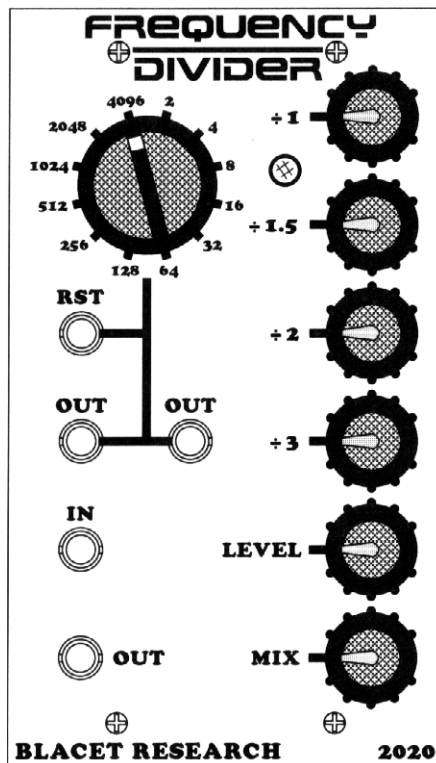
Blacet Research 15210 Orchard Rd Guerneville CA 95446
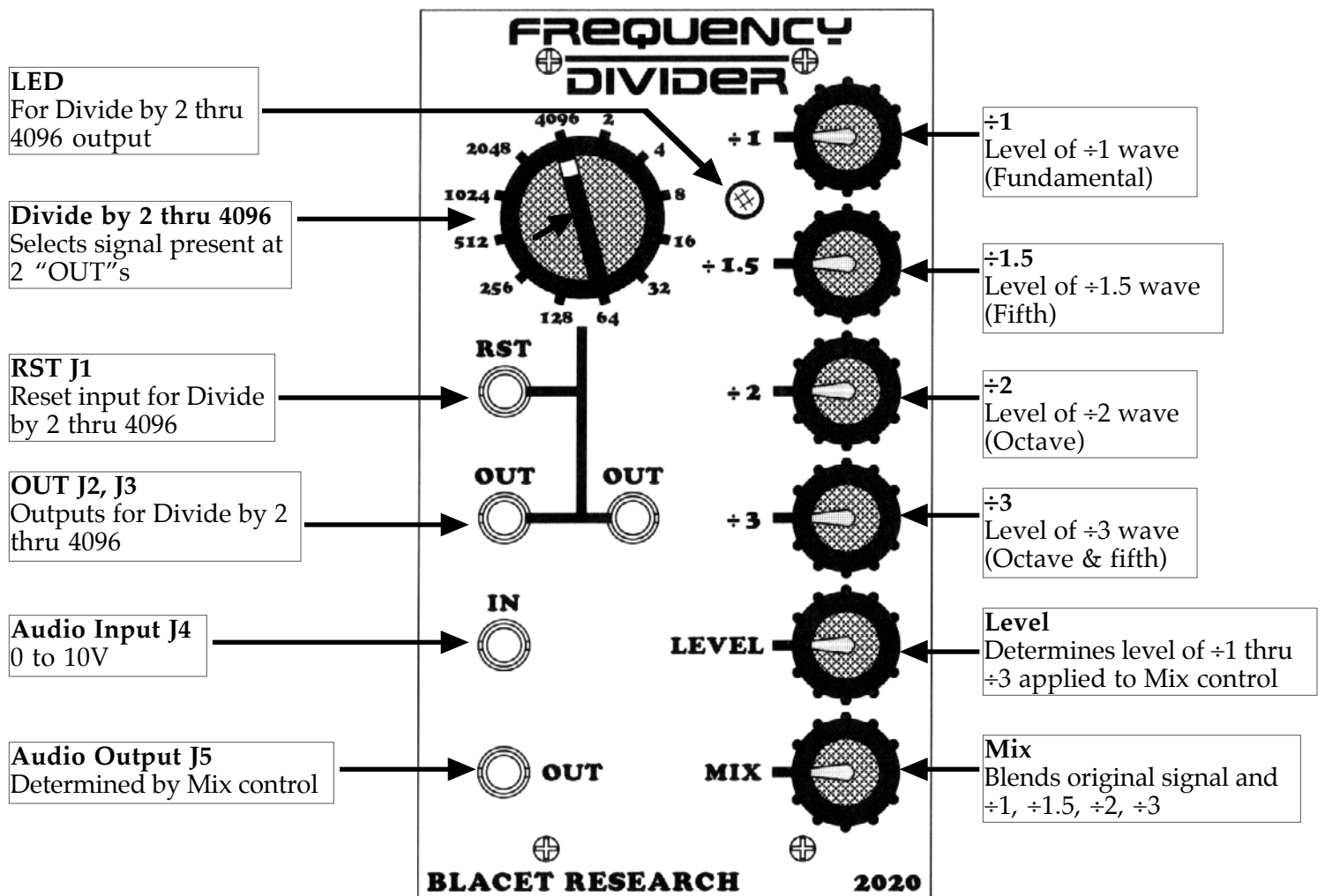blacet@blacet.com http://www.blacet.com   707-869-9164

Introduction

The Blacet Frequency Divider is a reissue of the original 1970's model, with a few enhancements added such as a Dry/Mix control, Level control, selectable output low-pass filtering, and a power up reset for the second divider chain.

The Frequency Divider converts a monophonic analog signal applied to the "IN" jack into digital pulses which are divided by two sections of CMOS digital counters. One section, controlled by the six pots on the right of the module, mixes divisions 1, 1.5, 2, and 3 together to form complex sub octave waveforms. The Level and Mix controls blend these waveforms with the original signal. Low-pass filtering via a PCB dipswitch can be added in three levels if external filtering is not being used. The output signal is present at the lower "OUT" jack.

The second counter section, controlled by the rotary switch on the left of the module, divides the input signal by 2 thru 4096. For example, a 440 Hz signal divided by 4096 would result in a 0.1 Hz signal at the upper two "OUT" jacks. The "RST" input resets the counter to zero.

Front Panel Controls

LED
For Divide by 2 thru 4096 output

Divide by 2 thru 4096
Selects signal present at 2 "OUT"s

RST J1
Reset input for Divide by 2 thru 4096

OUT J2, J3
Outputs for Divide by 2 thru 4096

Audio Input J4
0 to 10V

Audio Output J5
Determined by Mix control

÷1
Level of ÷1 wave (Fundamental)

÷1.5
Level of ÷1.5 wave (Fifth)

÷2
Level of ÷2 wave (Octave)

÷3
Level of ÷3 wave (Octave & fifth)

Level
Determines level of ÷1 thru ÷3 applied to Mix control

Mix
Blends original signal and ÷1, ÷1.5, ÷2, ÷3

Controls and Operation

The Frequency Divider might typically be patched into a modular system by connecting the IN to one VCO waveform output. The Audio Out would then be processed thru the VCF and VCA in the usual fashion. This is a configuration that gives the most stable results as the VCO is generally outputting some frequency.

Using the FD with sources such as keyboards will result in various degrees of stability, depending on the complexity and movement of the waveform. The fuzz-like glitches that may occur, especially at the very end of the note decay cycle are musically useful in a chaotic sort of way. Polyphonic note inputs will typically result in major confusion as the digital dividers, which can only follow one frequency at a time, attempt the impossible.

The tiny PCB DIP switch can be used to select three levels of low-pass filtering. This filter is applied to the ÷1 thru ÷3 outputs only. As the PCB legend implies, placing the #1 switch actuator in the up position results in the least filtering, followed by #2 in the up position, and both #1 and 2 in the up position. If both #1 and 2 are down, there is no filtering.

The FD can also be used to divide sequencer clocks and the second, ÷2 thru 4096 divider, is especially useful for this task. The Reset input will reset this divider if a voltage of +10 or greater (up to +15V) is present.

There are a wide variety of other uses for the FD, especially when used with modular synths.

If you are in a DIY mood someday, note that ALL the divisions of the FD are simultaneously available and that nice big pads have been included on the PCB access some of them. There are also three uncommitted buffer sections of the 4050 which can be used as output buffers. It is also possible to use the outputs without these buffers, but you should include a 2.2K to 10K resistor in series to help protect the circuitry from damage, especially from negative voltages.

Block Diagram
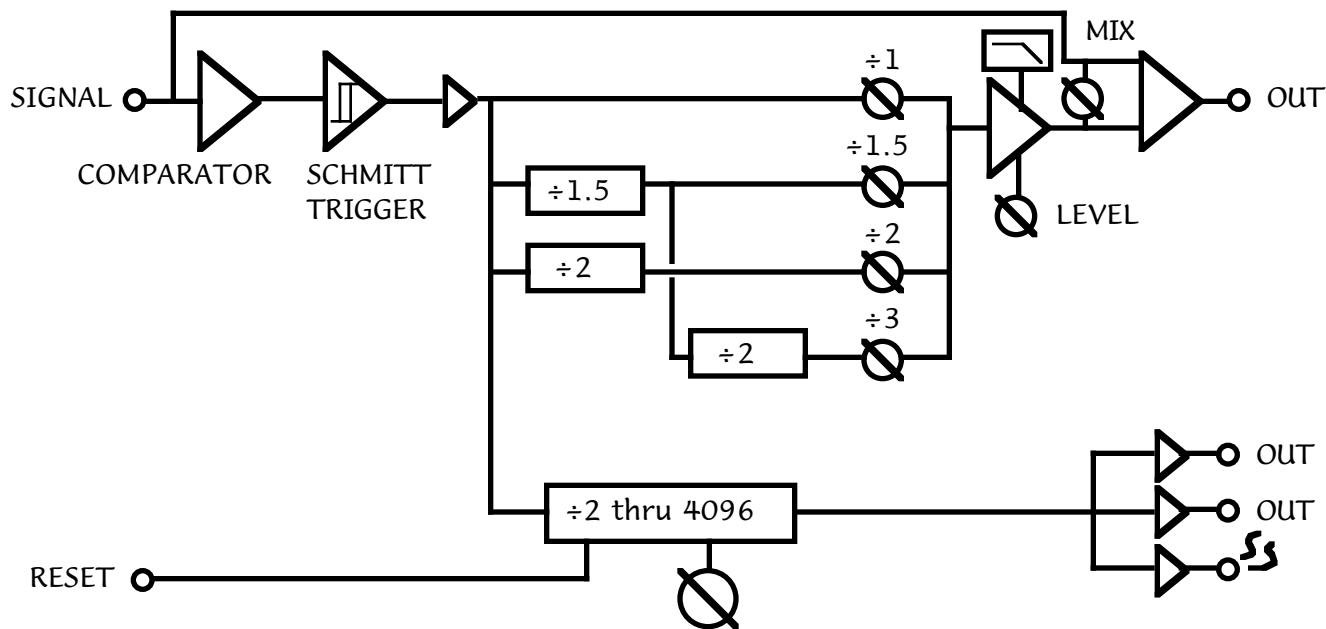
Front Panel Assembly
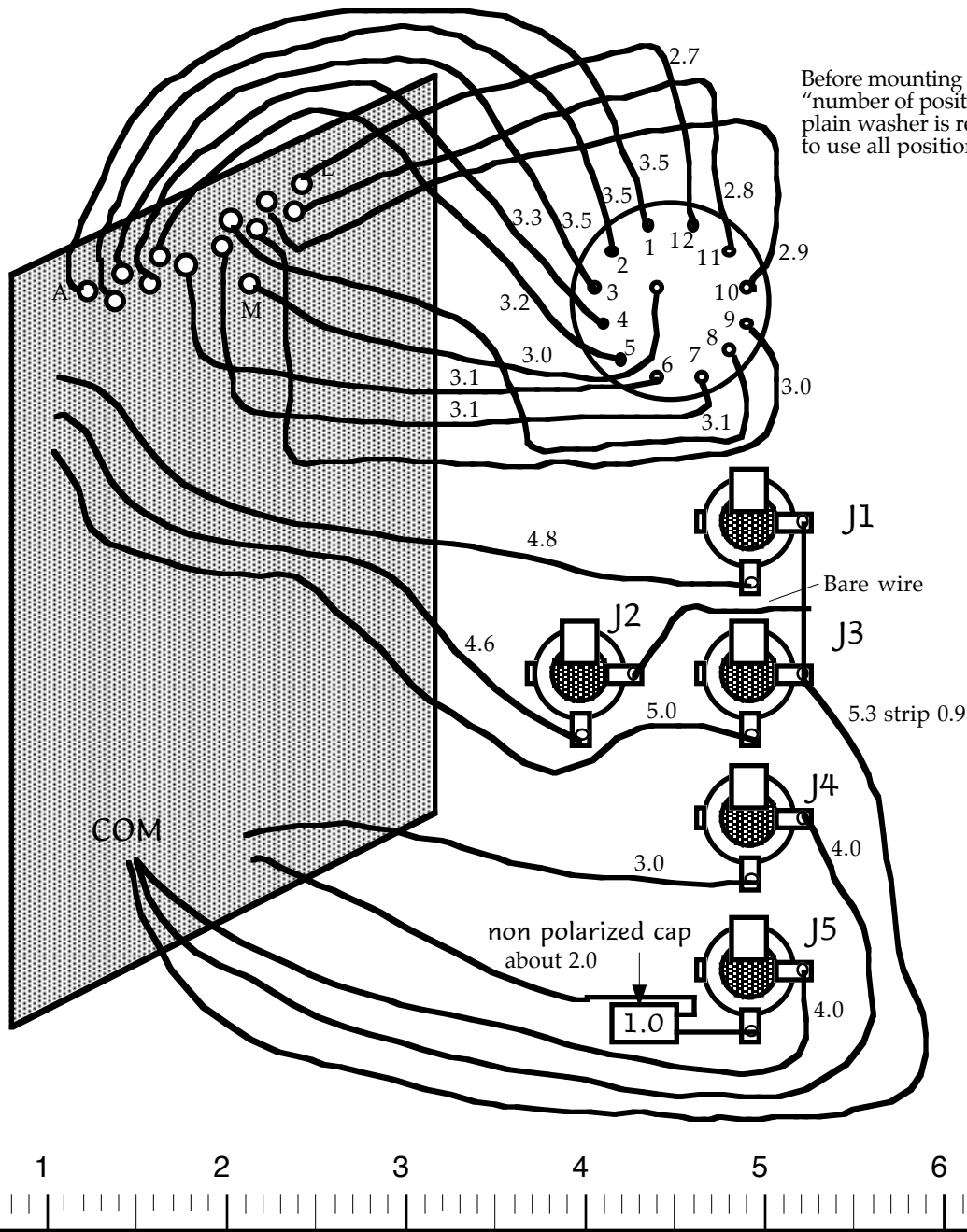
Before mounting switch, make sure "number of positions" lug on steel plain washer is removed (you want to use all positions).

Calibration

There are no calibration points on the Frequency Divider.

Repair

If you encounter problems that you can't solve, contact us, preferably via e-mail with a description of the problem. We can then help you get your module working.

Warranty

The parts contained in this unit have been carefully selected and tested. They are guaranteed for 90 days from the date of purchase. If you believe that you have a defective part (or if you have a part missing), contact us so we can provide you with a replacement or repair.

Specifications

Front Panel Size: 5.25 x 3" W
Module Depth: 5"
Input/Output Jacks: 3.5 mm (1/8")
Input Level: 0.0 to 10V P-P
Output Level: 0-15V
Reset Level: 10-15V
Power: +/-12 to +/-15 Vdc @+15/-6mA