

**3008 Universal Frequency Divider Module**

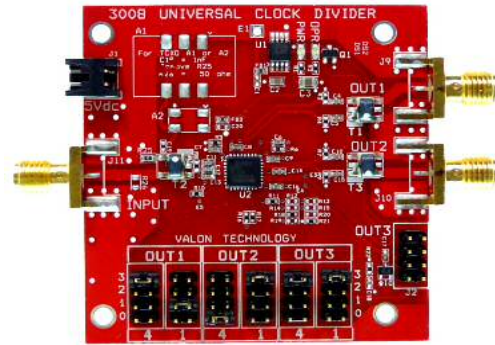
**Valon Technology, LLC**

The **3008** divider module accepts a wide range of input frequencies and provides **three** independent, user-selectable, frequency divided outputs. Useful for extending the low-frequency range of the 5007 down to 5MHz or can be used with any source, sine wave or square wave, from 5MHz to over 2GHz.

The sixteen available output division ratios are set by the user using hardware jumpers. The division ratios available are: 1,2,3,4,5,6,8,9,10,12,15,16,18,24,30,32. The divide-by-1 setting is useful for buffering and squaring a low-level RF signal.

Two ac coupled RF divider outputs are available with SMA connectors. A third divider output with CMOS compatible 3.3VTTL dc coupled level is available on the 2mm header.

Any divider can be set to divide-by-1 to provide a convenient buffered and squared version of the input.



**Specifications**

Parameter	Min	Typical	Max	Units	Notes
<b>RF Input Characteristics</b>					
Input frequency range	Max	2	1.6	GHz	Maximum divider input frequency is guaranteed to >1600MHz, typical performance is 2000MHz
	Min	10	6	MHz	
Input Impedance 50 ohm (return loss)	100-1000MHz	15	10	dB	input is ac coupled. There is dc continuity to ground through input 50 ohm termination.
	1000-2000MHz	10	6		
Input sensitivity	10MHz	-10	-15	dBm	input can tolerate +20dBm but not recommended
	100-1000MHz	-30	-40		
	1000-2000MHz	-20	-37		
Maximum input		0	13		
<b>Output characteristics</b>					
OUT 1& 2 RF divider 1 output frequency range	Max	2	1.6	GHz	50 Ω RF Output
	Min	5	2		
OUT 3 RF divider 3 output frequency range	Max	400	250	MHz	3.3VTTL Output 5pF load
	Min	0			
OUT 1 & 2 RF output level	<500MHz	3	6	dBm	50 Ω RF Output
	500-1000MHz	-3	0		
	>1000MHz	-6	-3		
OUT 3 Voltage levels		0.1	3.2	V	With 3.3kΩ load

**Power Requirements**

Parameter	Min	Typical	Max	Units	Notes
Input Voltage	3.6	5.0	7.0	Vdc	Recommended operating range
Input Voltage	-10		10	Vdc	Brief over voltage without damage
Input Current		150		mA	

**Divider Settings**

Jumper positions	MSB (4)	LSB (1)	divide by	duty cycle	Notes
	0	0	1	direct	
	0	1	2	50	Jumper headers OUT1, OUT2, and OUT3 are used to set the division ratios for each divider. Each divider ratio is selected by a 2-bit, base 4 code according to the table shown on the left. For example: to set a division ratio of 10:1, set the jumper labeled "4" to 2 and then set the jumper labeled "1" to 0.
	0	2	3	33	
	0	3	4	50	
	1	0	5	50	
	1	1	6	50	
	1	2	8	50	
	1	3	9	44	
	2	0	10	50	
	2	1	12	50	
	2	2	15	47	
	2	3	16	50	
	3	0	18	50	
	3	1	24	50	
	3	2	30	50	
	3	3	32	50	

**Power Requirements**

Parameter	Min	Typical	Max	Units	Notes
Supply Voltage	3.6	5.0	7.0	Vdc	Recommended operating range
Safe range	-10		10	Vdc	Brief over voltage without damage
Current		145	195	mA	

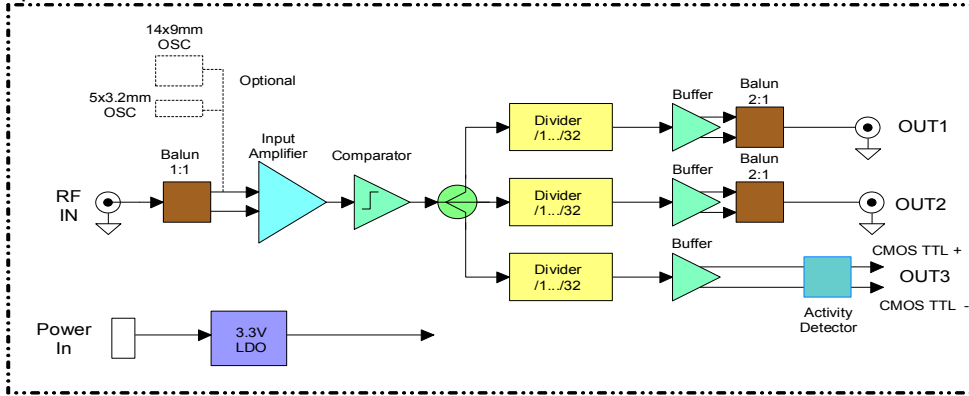
**Connectors**

RF input and Output 1 and 2	SMA Female	
dc power input	2-pin Hirose DF3A-2P-2DS	Power cable supplied
Output 3	8-pin Sullins 951208-8622-AR	2x4mm header

**Dimensions**

Length	1.875	Inches
Width	1.90	
Height	0.25	

3008 Description



The 3008 divider module is designed be an easily integratable component into any RF or digital system. The only external requirement is a modest 5V dc power source and input signal.

The RF input signal is applied to a balun to create a balanced ac coupled signal to the input amplifier. This balun is terminated in a dc coupled 50 ohm termination. DC continuity to ground is seen at the input SMA connector. The input signal should not have a dc component.

The input amplifier provides gain to the input signal and isolates the input from any noise from the comparator and dividers. The amplifier output drives the comparator which acts as a slicer to convert the input signal to a digital signal. The output of the comparator is applied to the three divider circuits.

All three divider circuits are completely independent and can be programmed separately. Each divider has a 2-bit, base-4 logic input. Unlike a binary bit, the base-4 logic can have one-of-four levels. Therefore, there are 2<sup>4</sup> settings (16). The settings are selected by the supplied 2mm jumpers (sometimes referred to as shunts). Use the Divider Settings table above.

The output signal from all three dividers is a "square" signal and as with all digital signals will have high harmonic content. The output of divider 1 and 2 is an ac coupled RF signal intended to drive 50 ohm RF loads. The output from divider 3 is a complimentary dc coupled signal suitable for driving a CMOS 3.3VTTL digital load.

Jumper headers OUT1, OUT2, and OUT3 are used to set the division ratios for each divider. Each divider ratio is selected by a 2-bit, base 4 code according to the table shown on the left. For example: to set a division ratio of 10:1, set the jumper labeled "4" to 2 and then set the jumper labeled "1" to 0.

On board provision is made for either 14mm x 9mm or 5mm x 3.2mm TCXOs and Oscillators. These optional oscillators may be user installed or special ordered. Installing an oscillator defeats any external input.

The divider module is capable of using a wide range of input signal from below -30dB to over +13dBm. In the divide by 1 mode, the module act as low jitter, zero-crossing threshold detector, buffer amplifier.

An "activity" circuit detects that the divider is functioning and valid input signal is present. The activity LED may be illuminated when no apparent input is present. This is usually caused by input noise or long, unterminated cables.

Mechanical dimensions and Connector Description

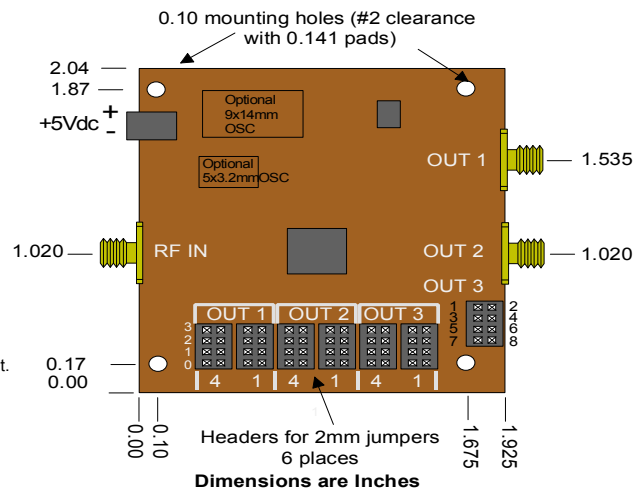
dc Power In

J1-1	dc power input positive	3.6 to 7.0V dc input
J1-2	dc power input negative	

Divider OUT 3

J2-1	OUT3 P	J2 Connector
J2-2	Vin (same as J1-1)	
J2-3	Ground	
J2-4	Ground	
J2-5	OUT3 N	
J2-6	+3.3V Reg	
J2-7	Ground	
J2-8	Ground	

Note: +3.3V Reg is either an output or and input. Can supply up to 50mA output.



**Optional Oscillator Installation**

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The new 3008 modules allow for the use of an optional crystal oscillator or TCXO. This will allow the 3008 to act as a convenient frequency reference. The 1/1 setting (0,0) can be used to provide the oscillator frequency out if desired or any of the other setting can be used to provide a divided output.

There is a pad layout provided for 9mm x 14mm at location A1 and a pad provision for 5mm x 3.2mm types at location A2. The location provides 3.3Volts and up to 25mA is available.

The user modifications are simple and can easily be done by anyone familiar with SMD type components. It is first necessary to remove R25, 0 ohm resistor, and move it to location R26. This will disable the RF input at J11. Next install 1NF, 0402 capacitor at location C19. If your oscillator has an ac coupled output, its not necessary to use a capacitor at C19, simply bridge the gap with a blob of solder.