The 5009b Dual Frequency Synthesizer module provides two independent RF frequency synthesizers covering the frequency range 20MHz to 6.4 GHz. Each synthesizer is phase locked to the same internal TCXO reference or can be locked to a high stability external reference. Programming the non-volatile settings can be accomplished using the 5009 Configuration Manager or any terminal emulation program including the Valon 5000term.exe through the micro-USB interface. LIst Mode and Sweep Step mode is also provided as well as serial TTL control through the User Port.

Electrical Specifications

DC Input

Input Voltage Range	
Absolute Max	+16V to -16V (reverse protected)
Operational Max	+8v
Recommended Operation Voltage	**+6V**
Reduced performance	+4.8 to 5.8V (output power reduced)
Min non-operational	+3.5V (synthesizer remains locked and serial port ok) >10V for >10sec resets the synthesizer to factory default settings
Input Current	
Source 1 and Source 2 on	400mA Output enabled 250mA Output disabled
Only Source 1 or Source 2 on	300mA Output enabled 150mA Output disabled
Source 1 and Source 2 off	70mA both disabled (standby)
DC Input Connector	Hirose DF3A-2P-2DS Mates with Hirose DF3-2S-2C plug and pre-crimped wire H2BXT-10112-R4 (red) and H2BXT-10112-B4 (black). Custom 20” dc cables supplied with synthesizer, additional cables available.

Full performance is obtained when the dc input voltage is in the operational range. If the input voltage is increased above the operational range, the output will be disabled and the synthesizer will be in standby mode. The synthesizer may be operated with reduced RF output power in the reduced performance voltage range. If the dc voltage is in the Min non-operational range, the output will be disabled but all user settings will be retained. Input voltages below the minimum non-operational range will cause a reset condition.

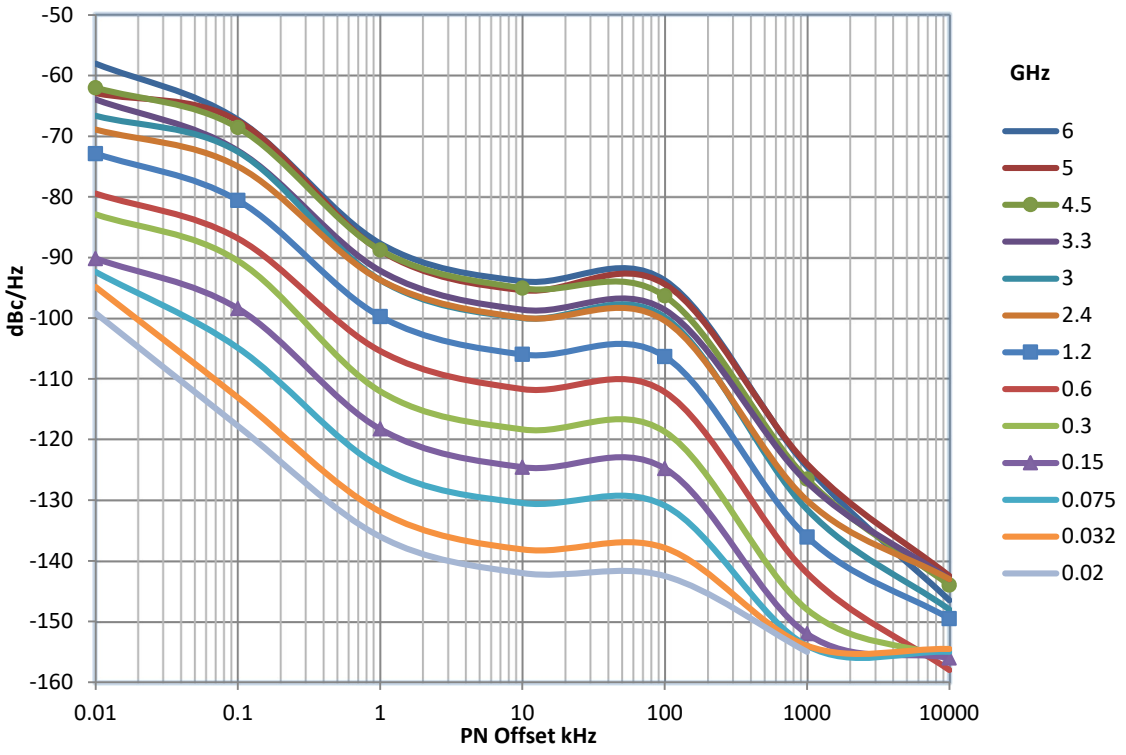
Note: The 5009b is **NOT** USB powered. You may purchase a Valon **PS6V-1** power supply kit.

RF Synthesizer Specifications (Unless otherwise noted, all specifications apply equally to both synthesizers.)

Frequency Range	20MHz to 6.4GHz							
Frequency Increment	1Hz (f <4294MHz), 10Hz (F> 4294MHz)							
Frequency Lock Time	<20uS							
Sweep rate	0.1ms to 1sec in 0.1ms steps							
Phase Noise	Typical phase noise							
GHz	**10Hz**	**100Hz**	**1kHz**	**10kHz**	**100kHz**	**1MHz**	**10MHz**	
6.0	-58	-67	-88	-93	-93	-124	-146	dBc/Hz
5.0	-62	-67	-88	-95	-94	-124	-142	
4.5	-62	-68	-88	-95	-96	-126	-144	
3.3	-63	-72	-92	-98	-98	-127	-143	
3.0	-66	-72	-93	-99	-99	-131	-148	
2.4	-69	-74	-93	-99	-100	-130	-143	
1.2	-72	-80	-99	-106	-106	-136	-149	
0.6	-79	-86	-105	-111	-112	-142	-158	
0.3	-82	-90	-112	-118	-118	-148	-155	
0.15	-90	-98	-118	-124	-124	-152	-155	
0.075	-92	-104	-124	-130	-130	154	-155	
0.032	-94	-113	-130	-136	-136	-154		
0.020	-99	-117	-136	-142	-142	-155		

Typical Phase Noise

BNC 7300

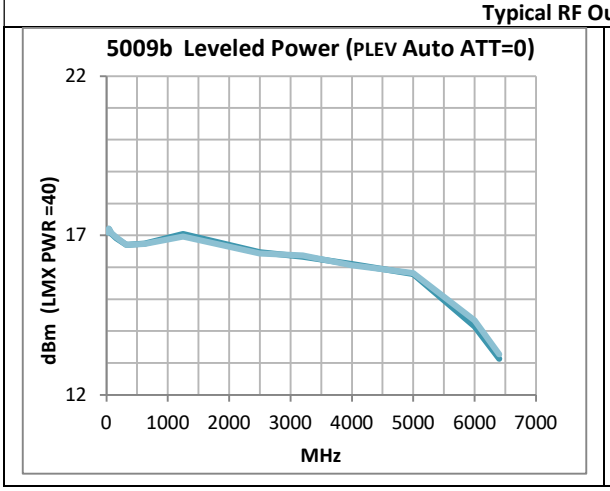


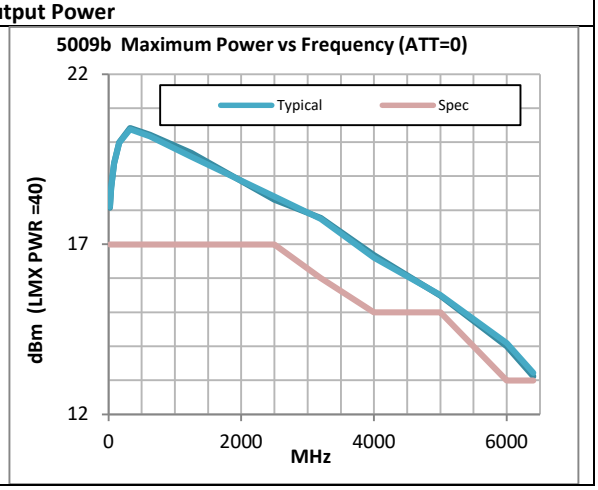
Harmonics	The 5009b output waveform is a clipped sine wave. Harmonics are typically 12dBc. Odd harmonics are most prominent.		
Spurious	Non-Harmonic <-60dBc except boundary spurs		
Output Return loss (dB)	ATT=0dB	ATT=3dB	ATT=15dB
100MHz ~ 2GHz	>6	>12	>20
2GHz ~ 4GHz	>12	>15	>10
4GHz ~ 6GHz	>6	>10	>10
Source to Source Isolation	>75dB		
RF Connectors	SMA Female		

AM Modulation (depth)	0.00dB to 31.75dB
AM Frequency	0.5Hz to 10kHz ±0.5Hz
AM Waveform	50% duty cycle square wave

Maximum Output Power		Min dBm	Typ. dBm	Max. dBm
(PLEV=40, ATT=0)	0~3000 MHz	>17	18	<20
	3~4 GHz	>15	16	<17
	4~6 GHz	>13	15	<16
Minimum Output Power		<-30dBm		(PLEV=0, ATT=0)
		<60dBm		(PLEV=0, ATT=31.5)
Attenuator Relative Attenuation Range		0.00dB to 31.75dB		
Attenuation Step Size		0.25dB		
RF output On/OFF		When off power is reduced by ~30dB		

Typical RF Output Power





Reference Frequency

Internal Reference	Frequency	10.000MHz
	Initial Accuracy	± 0.5ppm (23°C) can be zeroed with reference trim command
	Temperature Stability	±0.3ppm -20°C to +70°C (case temp)
	Reference Trim Range	± 10ppm
	Reference Trim Resolution	0.02ppm
External Reference		50Ω
	Frequency Range	10MHz to 100MHz (any arbitrary frequency within this range is permitted)
	Input power range	0dBm to +13dBm max.
External Reference Connector		SMA Female Note: Ext input is ac coupled to synthesizer but dc coupled to internal VCTCXO control circuit. External reference should be disconnected when using internal reference.
EFC Electronic frequency Control at external reference input		Pulling range >±10ppm Voltage ±3V Input resistance 20kΩ Frequency response 0Hz~>5kHz

Interface

USB	**Micro-B socket** FTDI virtual com port 9600, 8, N,1,N default- Automatically shift to 115200 with GUI See FTDI for drivers for your computer. Note: The Configuration Manager GUI will automatically configure the USB port and switch to 115200 baud rate.
USER PORT	**3.3V TTL TXD & RXD** *(see section 5)* 115200,8,N,1,N default Hirose DF11-8DP-2DS Mates with Hirose DF11-8DS-2C plug and pre-crimped wireH3BXT-10112-** (DigiKey) **LMS-1** LIst Mode switch and cable accessory is also available. External Trigger Input: 3.3V TTL Hi-Z input
Selectable Baud Rates	Either port: 9600, 19200, 38400, 57600,115200, 230400, 460800, 921600

Environmental

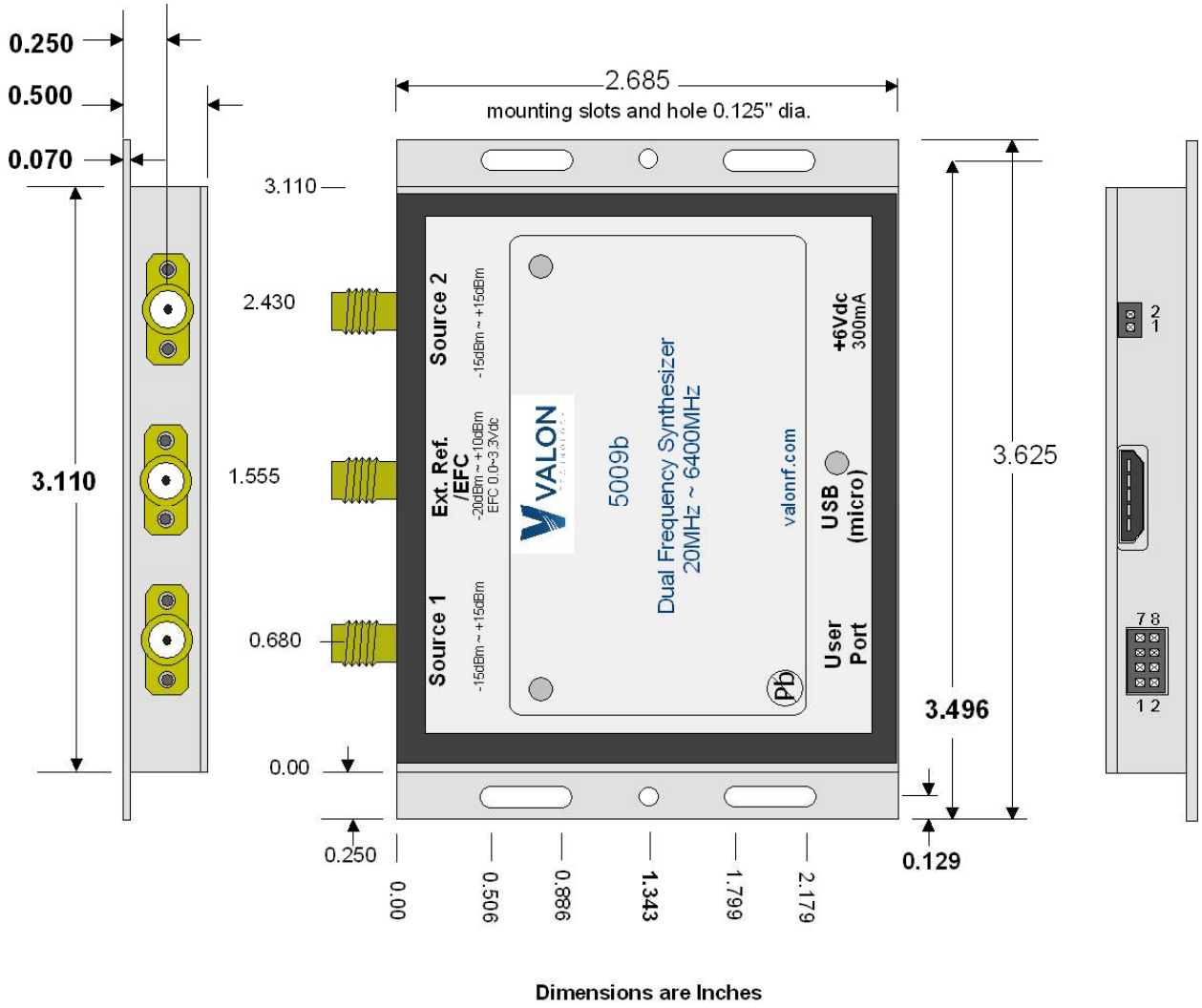
Operational full specifications:	-20°C~+70°C (case temperature)
No damage functional:	-40°C~+85°C (case temperature)
Humidity:	5%~95% minimal condensation allowed
IP rating:	50 No water protection.

Mechanical Dimensions

3.625"W x 2.685"L x 0.50"H

Weight: 0.2lbs, 91g

Material: AL-6061-T6
Finish: Clear Alodine (conductive)



Dimensions are Inches