ACCELERATED PERFORMANCE

NuWaves engineering

Trusted RF Solutions™

EXCELLENCE | AGILITY | INTEGRITY | RESPONSIVENESS

ABOUT NUWAVES

A veteran-owned small business (VOSB) founded in 2000, NuWaves Engineering is a premier supplier of Radio Frequency (RF) and Microwave solutions for military, government, industrial, and commercial customers. NuWaves provides quick-tempo design and engineering services that address the most demanding customer requirements, especially with regard to hardware size, weight and power (SWaP) reduction, cost and – oftentimes equally important – schedule. NuWaves also offers a broad catalog of high-performance commercial off-the-shelf (COTS) RF products, many of which have been derived from custom developments.

NuWaves Engineering endeavors to provide one-of-a-kind technical solutions for the U.S. Military, including high-technology Engineering Services and Products, and to achieve unsurpassed EXCELLENCE in client satisfaction.

*NuWaves' Quality Management System is **ISO 9001:2015** and **AS9100:2016 Rev D** Certified.*

NUWAVES IS KNOWN THROUGHOUT THE INDUSTRY FOR **HIGH-PERFORMANCE MINIATURE DESIGNS**, **QUICK-TEMPO** AND **COST-EFFECTIVE SOLUTIONS**, MEETING THE MOST DEMANDING CUSTOMER REQUIREMENTS.

WHAT WE OFFER

RF Design Services

NuWaves Engineering offers quick-tempo RF system, subsystem and module-level design services **from HF to Ku-band frequencies**. As a turn-key solutions provider, NuWaves can take an idea from the concept stage through design and development, prototyping and even transition it to production in a seamless and cost-effective manner.

Utilizing state-of-the-art design and simulation tools and relying on decades of applied experience, our RF engineers are capable of designing ***transmitters, receivers, transceivers, solid state power amplifiers, low noise amplifiers, RF front ends, upconverters, downconverters, preselectors, noise modules, synthesizers, modulators, IF chains, high-performance filters***, etc.

While best known for its RF and microwave engineering prowess, NuWaves Engineering is also adept at providing high-level communications and telemetry system-level design services. The company's complementary embedded systems design services include digital hardware, hardware description languages such as VHDL and Verilog, and embedded software/firmware such as C++ and C#. NuWaves also offers mechanical design and thermal analysis, using the very latest 3D CAD tools, allowing the team to ensure the mechanical design is optimized for fit while also taking heat transfer into consideration.

Engineering Services

NuWaves Engineering offers a wide breadth of Engineering Services related to the deployment, testing, evaluation and sustainment of advanced communications and telemetry systems.

System Sustainment – With in-depth organizational knowledge, extensive experience, and an exemplary track record of third-party system evaluation, characterization, obsolescence management, and re-engineering, NuWaves is well-positioned to provide critical system sustainment services to DoD and prime contractors.

Depot-Level Maintenance – NuWaves offers Depot-Level Maintenance for system sustainment programs, including material maintenance or repair that requires the overhaul, upgrading, or rebuilding of parts, assemblies, or sub-assemblies, and the testing and reclamation of equipment.

Environmental Testing – Our in-house environmental testing and screening capabilities include shock, vibration, temperature, humidity and EMI, helping ensure that our customers' stringent requirements are met with confidence.

RF Propagation Analysis – NuWaves offers site survey services and RF propagation analysis up to decimetric wavelengths (frequencies to 8 GHz) in support of robust system engineering design. NuWaves can determine your system specifications for link closure – inclusive of receiver performance and transmit power requirements.

CONTACT NUWAVES FOR ANY RF DESIGN OR ENGINEERING SERVICE YOU MAY REQUIRE

ISO 9001:2015 & AS9100:2016 Rev D CERTIFIED

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NuPower™ RF Power Amplifier Selection Guide

Power Amplifier Model	Frequency Range	RF Output Power (min / typ)	Drive Level	Gain (typ)	Supply Voltage	Current Consumption (@ 28 Vdc)	Size (L x W x H)	Weight	Operating Temperature (Baseplate)
NuPower 11B02A	200 - 2600 MHz	7 W / 10 W	0 dBm	40 dB	+11 to +32 VDC	1.40 A (typ)	2.34″ x 1.96″ x 0.62″	2.0 oz.	-40 to +85 °C
NuPower 11C01A	225 - 2400 MHz	10 W / 15 W	0 dBm	40 dB	+11 to +32 VDC	1.50 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 13G05A	800 - 2000 MHz	35 W / 50 W	0 dBm	45 dB	+27 to +30 VDC	3.00 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +85 °C
NuPower 15D05A	800 - 2500 MHz	20 W (min)	0 dBm	44 dB	+27 to +30 VDC	3.00 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +85 °C
NuPower L60T01A	960 - 1390 MHz	60 W (min)	0 dBm	48 dB	+27 to +30 VDC	3.60 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +60 °C
NuPower 12B01A	1000 - 2500 MHz	10 W / 18 W	0 dBm	40 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-D30	1000 - 2500 MHz	10 W / 18 W	+30 dBm	10 dB	+11 to +32 VDC	1.50 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12A03A	1000 - 2500 MHz	5 W (min)	0 dBm	37 dB	+27 to +30 VDC	0.85 A (typ)	1.80″ x 1.80″ x 0.50″	1.3 oz.	-30 to +85 °C
NuPower 12A03A-D30	1000 - 2500 MHz	5 W (min)	+30 dBm	7 dB	+27 to +30 VDC	0.85 A (typ)	1.80″ x 1.80″ x 0.50″	1.3 oz.	-30 to +85 °C
NuPower 12A01A	1000 - 2500 MHz	4 W (linear)	0 dBm	37 dB	+27 to +30 VDC	0.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-01	1000 - 1500 MHz	11 W / 17 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-02	1000 - 2000 MHz	10 W / 16 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-03	1435 - 1525 MHz	11 W / 15 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-04	1435 - 1850 MHz	10 W / 15 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-05	1435 - 2395 MHz	10 W / 16 W	0 dBm	40 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-06	1500 - 2000 MHz	10 W / 16 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-07	1500 - 2500 MHz	10 W / 16 W	0 dBm	40 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12D05A	1700 - 2400 MHz	20 W / 35 W	0 dBm	45 dB	+27 to +30 VDC	3.60 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +85 °C
NuPower 12B01A-08	1755 - 1850 MHz	11 W / 14 W	0 dBm	42 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 12B01A-09	2000 - 2500 MHz	10 W / 16 W	0 dBm	40 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower 05E05A	2000 - 2600 MHz	20 W / 30 W	0 dBm	44 dB	+27 to +30 VDC	2.70 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +85 °C
NuPower 12B01A-10	2200 - 2395 MHz	10 W / 14 W	0 dBm	40 dB	+11 to +32 VDC	1.70 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °C
NuPower S100A01	2300 - 2500 MHz	100 W (min)	+30 dBm	20 dB	+26 to +32 VDC	8.00 A (typ)	6.50″ x 4.50″ x 1.00″	22.6 oz.	-40 to +85 °C
NuPower C10Q01	4400 - 4900 MHz	10 W (min)	+10 dBm	30 dB	+22 to +32 VDC	3.50 A (typ)	8.09″ x 2.96″ x 1.00″	32.0 oz.	-40 to +60 °C
NuPower C20R01	4400 - 4900 MHz	20 W (min)	0 dBm	43 dB	+27 to +32 VDC	3.60 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +60 °C
NuPower C30R01	5030 - 5090 MHz	30 W / 35 W	0 dBm	45 dB	+27 to +32 VDC	4.10 A (typ)	4.50″ x 3.50″ x 0.61″	9.0 oz.	-40 to +60 °C
NuPower C10Q02	5285 - 5850 MHz	10 W (min)	+10 dBm	30 dB	+22 to +32 VDC	4.00 A (typ)	8.09″ x 2.96″ x 1.00″	32.0 oz.	-40 to +60 °C





NuPower Xtender™ RF Bidirectional Amplifier Selection Guide

Bidirectional Amplifier Model	Frequency Range	RF Output Power (min / typ)	Drive Level	Gain (typ)	Supply Voltage	Current Consumption (@ 28 Vdc)	Size (L x W x H)	Weight	Operating Temperature (Baseplate)
NuPower Xtender VU4GX02	225 - 512 MHz	4 W (linear)	+5 dBm	31 dB	+10 to +32 VDC	1.10 A (typ)	2.34″ x 2.34″ x 0.61″	2.0 oz.	-40 to +85 °C
NuPower Xtender 12B04A	1000 - 2500 MHz	7 W / 10 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12C04A	1000 - 2500 MHz	12 W / 15 W	+5 dBm	35 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-01	1000 - 1500 MHz	13 W / 16 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-02	1000 - 2000 MHz	13 W / 17 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-03	1435 - 1525 MHz	14 W / 16 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-04	1435 - 1850 MHz	14 W / 18 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-05	1435 - 2395 MHz	11 W / 16 W	+5 dBm	35 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-06	1500 - 2000 MHz	14 W / 18 W	+5 dBm	35 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-07	1500 - 2500 MHz	11 W / 17 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-08	1755 - 1850 MHz	15 W / 18 W	+5 dBm	35 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-09	2000 - 2500 MHz	11 W / 16 W	+5 dBm	35 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-10	2200 - 2395 MHz	11 W / 16 W	+5 dBm	35 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender 12B04A-D27	2400 - 2500 MHz	25 W (typ)	+27 dBm	15 dB	+11 to +32 VDC	2.50 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C
NuPower Xtender C15RX01	4400 - 4900 MHz	15 W (min)	0 dBm	43 dB	+27 to +32 VDC	4.60 A (typ)	5.50″ x 4.50″ x 1.16″	10.5 oz.	-40 to +85 °C
NuPower Xtender C10RX01	4400 - 5100 MHz	10 W (min)	+30 dBm	10 dB	+27 to +32 VDC	1.75 A (typ)	3.57″ x 2.57″ x 0.50″	2.6 oz.	-40 to +85 °C
NuPower Xtender C10RX03	4400 - 5100 MHz	10 W (min)	+30 dBm	10 dB	+27 to +32 VDC	1.75 A (typ)	3.57″ x 2.57″ x 0.50″	2.6 oz.	-40 to +85 °C
NuPower Xtender C15RX03	5030 - 5091 MHz	15 W (typ)	0 dBm	40 dB	+27 to +32 VDC	4.60 A (typ)	5.50″ x 4.50″ x 1.16″	10.5 oz.	-40 to +85 °C
NuPower Xtender C10RX03-C037	5150 - 5875 MHz	8 W / 10 W	+30 dBm	10 dB	+27 to +32 VDC	3.00 A (typ)	3.57″ x 2.57″ x 0.50″	3.0 oz.	-40 to +85 °C

HILNA™ High Intercept Low Noise Amplifier Selection Guide

LNA Model	Frequency Range	Gain	Noise Figure	OIP3	Supply Voltage	Current Consumption	Size (L x W x H)	Weight	Operating Temperature
HILNA HF	2 - 50 MHz	30 dB	3 dB	+30 dBm	+12 to +30 VDC	300 mA @ +12 VDC	3.15" x 2.50" x 1.18"	5 oz.	-30 to +70 °C
HILNA HF AGC	2 - 50 MHz	30 dB	3 dB	+30 dBm	+12 to +30 VDC	300 mA @ +12 VDC	3.15" x 2.50" x 1.18"	5 oz.	-30 to +70 °C
µHILNA	50 - 1500 MHz	20 dB	1 dB	+31 dBm	+5 to +12 VDC	82 mA @ +12 VDC	1.00" x 0.75" x 0.50"	0.5 oz.	-20 to +60 °C
HILNA V1	50 - 1000 MHz	20 dB	0.8 dB	+32 dBm	+5 to +20 VDC	70 mA @ +12 VDC	3.15" x 2.50" x 1.18"	5 oz.	-30 to +70 °C
HILNA G2V1	50 - 1000 MHz	40 dB	0.8 dB	+31 dBm	+5 to +20 VDC	140 mA @ +12 VDC	3.15" x 2.50" x 1.18"	5 oz.	-30 to +70 °C
HILNA GPS	1200 - 1600 MHz	32 dB	0.8 dB	+30 dBm	+5 to +20 VDC	140 mA @ +12 VDC	3.15" x 2.50" x 1.18"	5 oz.	-30 to +70 °C
HILNA GPS C034 [1]	1200 - 1600 MHz	32 dB	0.8 dB	+30 dBm	+22 to +34 VDC	60 mA @ +28 VDC	3.76" x 3.27" x 0.95" [2]	5 oz.	-30 to +70 °C
HILNA LS	1000 - 3000 MHz	50 dB	1.7 dB	+33 dBm	+5 to +15 VDC	300 mA @ +12 VDC	2.50" x 1.75" x 0.75"	2.5 oz.	-20 to +60 °C
HILNA LS C021 [3]	1000 - 3000 MHz	15 dB	1.7 dB	+33 dBm	+5 to +15 VDC	130 mA @ +12 VDC	2.50" x 1.75" x 0.75"	2.5 oz	-20 to +60 °C
HILNA LS C026 [4]	1400 - 1900 MHz	21 dB	2 dB	+30 dBm	+5 to +8 VDC	275 mA @ +5 VDC	2.50" x 1.70" x 0.75"	3 oz.	-20 to +85 °C
HILNA CX	5 - 10 GHz	35 dB	2.5 dB	+21 dBm	+5.5 to +20 VDC	170 mA @ +5.5 VDC	1.77" x 1.52" x 0.45"	1.3 oz.	-20 to +60 °C

Notes:

1 HILNA GPS C034 module incorporates a ruggedized chassis
2 Measurement includes built-in mounting flange
3 HILNA LS C021 modules utilizes micro-D connector
4 HILNA LS C026 module is hermetically sealed

RF Frequency Converter Selection Guide

Frequency Converter Model	RF Frequency	IF Frequency	IF Rejection	Tuning Resolution	Supply Voltage	Current Consumption	Size (L x W x H)	Weight	Operating Temperature
RF Upconverter:									
Multi-Octave RF Upconverter	2 - 3000 MHz	2 - 70 MHz	30 dB	5 kHz	+6 VDC	600 mA @ +6 VDC	3.50" x 2.50" x 1.00"	7.4 oz.	-15 to +50 °C
RF Downconverter									
ConvertaWave™ RF Downconverter	225 - 500 MHz	70 MHz	80 dB	100 kHz	+10 to +18 VDC	220 mA @ 12 VDC	6.50" x 4.00" x 0.75"	11.3 oz.	-20 to +50 °C
ConvertaWave2™ RF Downconverter	200 - 2500 MHz	70 MHz	100 dB	1 Hz	+9 to +16 VDC	400 mA @ 12 VDC	7.00" x 4.00" x 1.35"	18.6 oz.	-20 to +50 °C

NuFilter™ High Performance RF Cavity Filter Selection Guide

Filter Part Number	Center Frequency	Insertion Loss	Power Handling	Passband Bandwidth	Lower Stopband Frequency	Lower Stopband Rejection	Upper Stopband Frequency	Upper Stopband Rejection	Size (L x W x H)
NW-FL-04BPCV-1575-SFSF-M01	1575 MHz	0.4 dB	50 W	250 MHz	1300 MHz	20 dBc	1850 MHz	20 dBc	2.74" x 1.30" x 1.15"
NW-FL-12BPCV-2049.5-SMSF-M01	2049.5 MHz	0.75 dB	50 W	700 MHz	1600 MHz	40 dBc	3000 MHz	25 dBc	4.14" x 0.73" x 0.84"
NW-FL-03BPCV-6301-SFSF-M01	6301.7 MHz	0.7 dB	10 W	126 MHz	3150.8 MHz	51 dBc	9452.5 MHz	40 dBc	1.62" x 0.78" x 0.72"
NW-FL-10BPCV-8200-SFSF-M01	8200 Mhz	0.6 dB	50 W	1000 MHz	7480 MHz	40 dBc	8920 MHz	40 dBc	3.72" x 0.66" x 0.53"
NW-FL-04BPCV-8325-SFSF-M01	8325 MHz	0.6 dB	1 W	1050 MHz	6050 MHz	35 dBc	10400 MHz	35 dBc	1.30" x 0.66" x 0.47"
NW-FL-05BPCV-10400-SFSF-M01	10.4 GHz	0.5 dB	50 W	400 MHz	9800 MHz	30 dBc	11 GHz	30 dBc	2.18" x 0.66" x 0.54"
NW-FL-06BPCV-10400-SFSF-M01	10.4 GHz	0.7 dB	50 W	400 MHz	9900 MHz	40 dBc	11 GHz	40 dBc	2.62" x 0.66" x 0.54"

The NuFilter product line includes pre-designed cavity filters, as well as quick-turn custom cavity filters. Our QUICKFIL program provides quotations within 24 hours, which also includes a response plot and mechanical drawing, and finished filters within 2-3 weeks after receipt of order. Please call with your specifications, or consult our website for additional details.

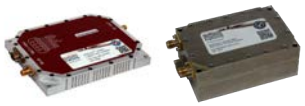
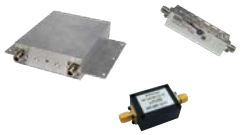
Tunable RF Broadband Preselector Selection Guide

Preselector Model	RF Frequency	3 dB Bandwidth	Tuning Resolution	Supply Voltage	Current Consumption	Size (L x W x H)	Weight	Operating Temperature
HiPerTuner	200 - 2500 MHz	4 to 8 %	1 MHz	+9 to + 16 VDC	150 mA @ +12 VDC	6.50" x 4.00" x 0.75"	11.3 oz.	-20 to +50 ℃

RF & MICROWAVE PRODUCTS

Military • Government • Industrial

NuWaves Engineering is a premier supplier of Radio Frequency (RF) products, with a particular emphasis on subsystem, module-level products. Our market-leading designs are derived from over a decade of successful RF engineering design service work for a wide breadth of clients.

RF Upconverters	Programmable IF & RF 2 to 70 MHz IF input 2 MHz to 3 GHz RF output	
RF Downconverters	Programmable from 200 MHz to 2.5 GHz 70 MHz IF output User-selectable IF bandwidths	
Power Amplifiers	100 MHz to 5.85 GHz 5 W to 100 W Miniature size – as small as 1.6 in^3	
Bidirectional Amplifiers	1.0 GHz to 5.875 GHz 5 W to 18 W Linear models for OFDM, etc.	
Low Noise Amplifiers	2 MHz to 10 GHz 20 to 50 dB of gain Ruggedized & lab models	
RF Filters	Cavity Filters, UHF to Ku Band Miniature, connectorized filters 300 MHz to 2.4 GHz 1-40% 3 dB bandwidth	
Preselectors & Tuners	Fully programmable 200 MHz to 2.5 GHz 4-8% 3 dB bandwidth	

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