ACCELERATED PERFORMANCE

NuWaves engineering

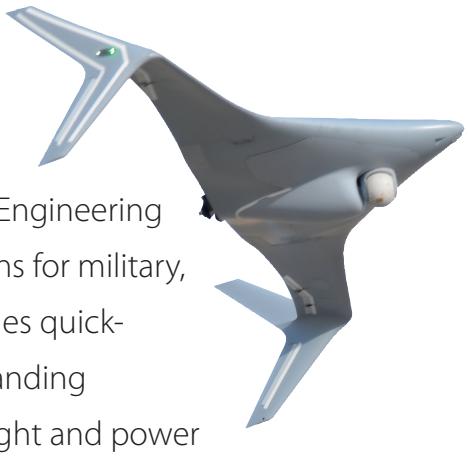
Trusted RF Solutions™

2022

2nd Quarter

EXCELLENCE | AGILITY | INTEGRITY | RESPONSIVENESS

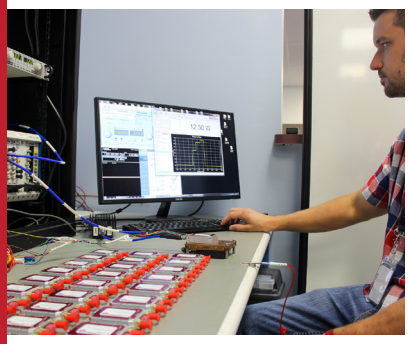
ABOUT NUWAVES

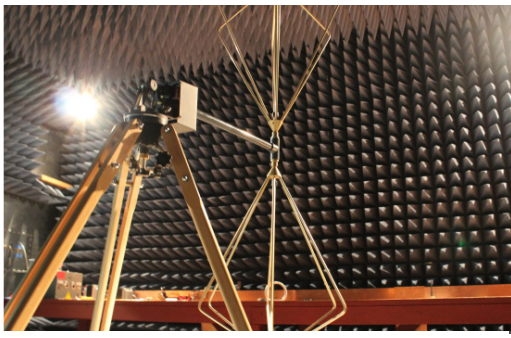


A veteran-owned small business (VOSB) founded in 2000, NuWaves Engineering is a premier supplier of Radio Frequency (RF) and Microwave solutions for military, government, industrial, and commercial customers. NuWaves provides quick-tempo design and engineering services that address the most demanding 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

NuWaves engineering

Trusted RF Solutions™

ACCELERATED PERFORMANCE

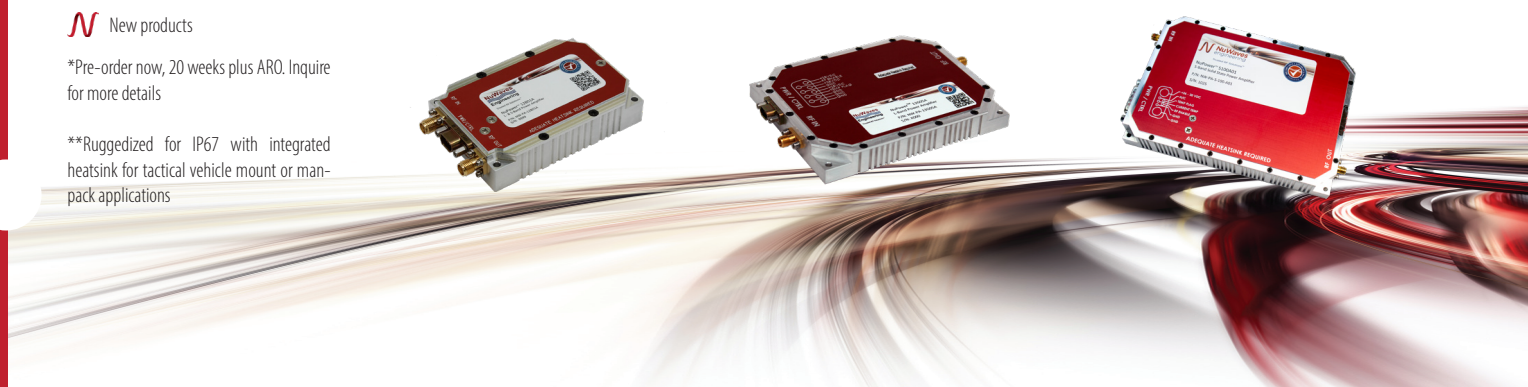
NuPower™ RF Power Amplifier Selection Guide

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 11B02A-TAC**	200 - 2600 MHz	7 W / 10 W	0 dBm	40 dB	+11 to +32 VDC	1.40 A (typ)	4.50″ x 3.50″ x 1.50″	20.0 oz	-40 to +85 °C
NuPower ULS-25-C01-S01	200 - 2600 MHz	10 W / 25 W	0 dBm	44 dB	+11 to +32 VDC	2.0 A (typ)	2.34″ x 1.96″ x 0.62″	2.0 oz	-40 to +85 °C
NuPower U-20-C01-S01	225 - 1000 MHz	20 W (typ)	0 dBm	43 dB	+11 to +30 VDC	1.50 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 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-C01	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 LS75T01	800 - 2500 MHz	75 W (typ)	+3 dBm	46 dB	+11 to +32 VDC	6.80 A (typ)	5.0″ x 10.0″ x 0.61″	21.0 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 LS-20-C01-S01	1000 - 2500 MHz	20 W	0 dBm	43 dB	+11 to +32 VDC	2.10 A (typ)	3.00″ x 2.00″ x 0.65″	3.0 oz.	-40 to +85 °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 LS5MI01	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 LS5MI01-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	18W / 25 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	16 W / 26 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	20 W / 26 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	18 W / 26 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	15 W / 23 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	15 W / 26 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	2000 - 2500 MHz	90 W/125 W	+30 dBm	21 dB	+26 to +32 VDC	11.50 A (typ)	6.50″ x 4.50″ x 1.00″	22.6 oz.	-40 to +70 °C
NuPower S-10-C01-S01	3000-4000 MHz	10 W (min)	-5 dBm	44 dB	+11 to +32 VDC	1.80 A (typ)	3.25″ x 2.00″ x 0.50″	3.0 oz	-40 to +60 °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 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 C10R01	5100 -5900 MHz	8 W / 18 W	0 dBm	40 dB	+22 to +32 VDC	1.60 A (typ)	3.57″ x 2.57″ x 0.5″	2.6 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 ULSC-20-C01-S01*	500 - 6000 MHz	20 W	+5 dBm	38 dB	+20 to +32 VDC	2.20 A (typ)	5.50″ x 3.42″ x1.50″	28.0 oz.	-40 to +85 °C

New products

*Pre-order now, 20 weeks plus ARO. Inquire for more details

**Ruggedized for IP67 with integrated heatsink for tactical vehicle mount or man-pack applications

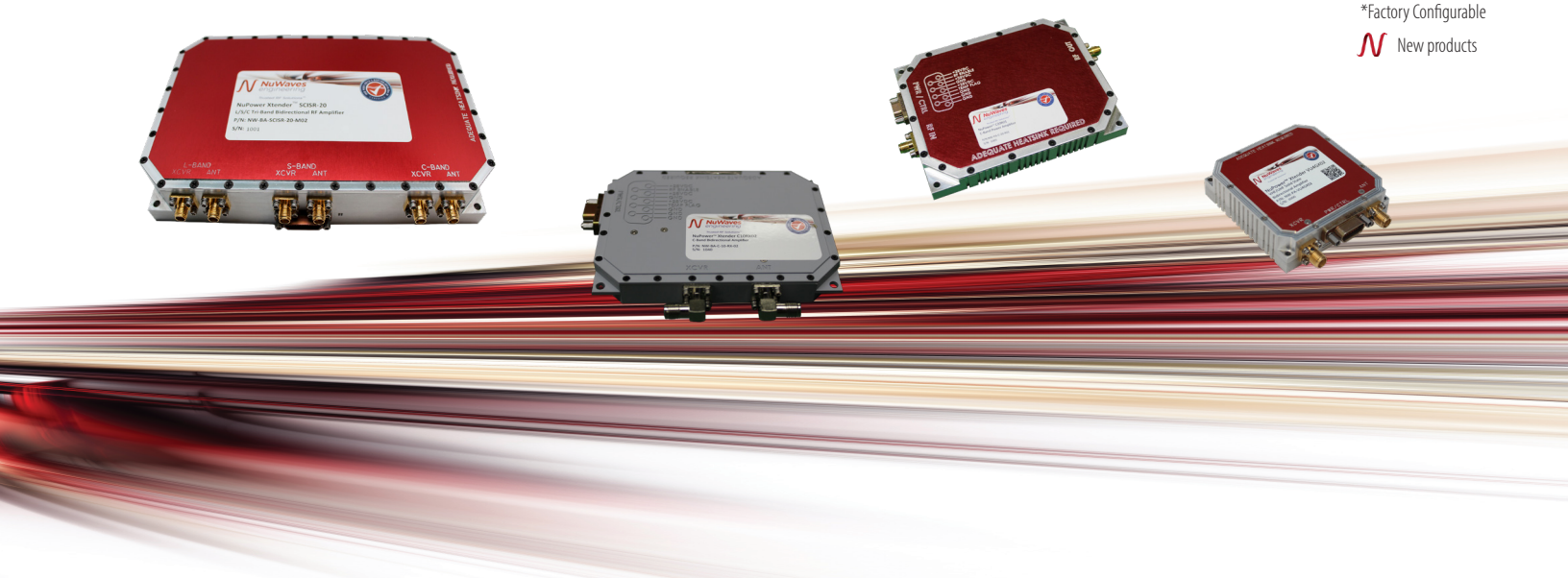


NuPower Xtender™ Bidirectional Amplifiers/ Multi-Channel, Multi-Band Bidirectional Amplifiers

	Bidirectional Amplifier Model		Frequency Range	RF Output Power (min / typ)	Drive Level	Tx Gain (typ)	Rx Gain (typ)	Supply Voltage	Current Consumption (@ 28 Vdc)	Size (L x W x H)	Weight	Operating Temperature (Baseplate)	Auto-Sense or Manual Switching
N	**NuPower Xtender VU4GX02-C01**		225 - 450 MHz	12 W (typ)	- 10 dBm	51 dB	Pass Through (-1.15 dB)	+10 to +32 VDC	1.40 A (typ)	2.34″ x 2.34″ x 0.61″	2.0 oz.	-40 to +85 °C	Manual
	NuPower Xtender VU4GX02		225 - 512 MHz	16 W (typ)	+5 dBm	31 dB	15 dB	+10 to +32 VDC	1.10 A (typ)	2.34″ x 2.34″ x 0.61″	2.0 oz.	-40 to +85 °C	Manual
	NuPower Xtender U-20-C01-S01		800 - 1000 MHz	20 W	+ 5 dBm	38 dB	18 dB	+11 to +32 VDC	2.40 A (typ)	3.0″ x 2.0″ x 1.16″	5.8 oz	-40 to +60 °C	Both
	NuPower Xtender 12B04A		1000 - 2500 MHz	7 W / 10 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12C04A		1000 - 2500 MHz	12 W / 15 W	+5 dBm	35 dB	13 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-01		1000 - 1500 MHz	13 W / 16 W	+5 dBm	35 dB	13 dB	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-02		1000 - 2000 MHz	13 W / 17 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
N	**NuPower Xtender LS10S01**		1000 - 2500 MHz	20 W (typ)	+5 dBm	38 dB	14 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 0.65″	5.8 oz.	-40 to +60 °C	Both
N	**NuPower Xtender LS10S01-D30**		1000 - 2500 MHz	20 W (typ)	+30 dBm	13 dB	14 dB	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 0.65″	5.8 oz.	-40 to +60 °C	Both
N	**NuPower Xtender LS-20-C01-S01**		1000 - 2500 MHz	20 W (typ)	+27 dBm	16 dB	19 dB	+11 to +32 VDC	2.00 A (typ)	2.34″ x 1.96″ x 0.62″	2.0 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-03		1435 - 1525 MHz	14 W / 16 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-04		1435 - 1850 MHz	14 W / 18 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-05		1435 - 2395 MHz	11 W / 16 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-06		1500 - 2000 MHz	14 W / 18 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-07		1500 - 2500 MHz	11 W / 17 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-08		1755 - 1850 MHz	15 W / 18 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.20 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-09		2000 - 2500 MHz	11 W / 16 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-10		2200 - 2395 MHz	11 W / 16 W	+5 dBm	35 dB	13 db	+11 to +32 VDC	2.30 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-D27		2400 - 2500 MHz	20 W (typ)	+27 dBm	15 dB	13 dB	+11 to +32 VDC	2.50 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz.	-40 to +60 °C	Both
	NuPower Xtender 12B04A-D30		1000 - 2500 MHz	10 W/ 15 W	+30 dBm	13 dB	13 dB	+11 to +27 VDC	2.10 A (typ)	3.00″ x 2.00″ x 1.16″	5.8 oz	-40 to +60 °C	Both
	NuPower Xtender C15RX01		4400 - 4900 MHz	15 W (min)	0 dBm	43 dB	10 dB	+27 to +32 VDC	4.60 A (typ)	5.50″ x 4.50″ x 1.16″	10.5 oz.	-40 to +85 °C	Manual
	NuPower Xtender C15RX01-C044		5030 - 5091 MHz	15 W (min)	0 dBm	40 dB	7.5 dB	+27 to +32 VDC	4.60 A (typ)	5.50″ x 4.25″ x 0.68″	10.5 oz.	-40 to +85 °C	Manual
	NuPower Xtender C10RX01		4400 - 5100 MHz	10 W (min)	+30 dBm	10 dB	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	Manual
	NuPower Xtender C10RX03		4400 - 5100 MHz	10 W (min)	+30 dBm	10 dB	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	Auto-Sense
	NuPower Xtender C15RX03		5030 - 5091 MHz	15 W (typ)	0 dBm	40 dB	7.5 dB	+27 to +32 VDC	4.60 A (typ)	5.50″ x 4.50″ x 1.16″	10.5 oz.	-40 to +85 °C	Manual
	NuPower Xtender C10RX03-C037		5150 - 5875 MHz	8 W / 10 W	+30 dBm	10 dB	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	Both*
N	**NuPower Xtender ULSC-20-C01-S01**		500 - 6000 MHz	20 W (typ)	+5 dBm	38 dB	15 dB	+20 to +32 VDC	2.20 A (typ)	6.00″ x 4.25″ x 1.50″	40.0 oz.	-40 to +75 °C	Not Applicable
	NuPower Xtender SCISR-20	L- & S- Band	1000 - 2500 MHz	20 W (typ)	+30 dBm	13 dB	16 dB	+11 to +32 VDC	2.10 A (typ)	7.25 x 4.50 x 1.375	34 oz.	-40 to +60 °C	Both*
		C-Band	4400 - 5100 MHz	10 W (typ)		10 dB	12 dB	+27 to +32 VDC	1.60 A (typ)				

*Factory Configurable

N New products



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

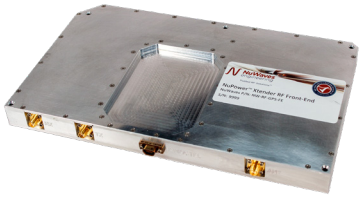
Frequency Converter Model	RF Frequency	IF Frequency	IF Rejection	Tuning Resolution	Supply Voltage	Current Consumption	Size (L x W x H)	Weight	Operating Temperature
Multi-Octave RF Upconverter	2 - 3000 MHz	2 - 70 MHz	30 dB	5 kHz	+6 VDC	600 mA @ +6 VDC	3.50" x 2.50" x 1.00"	7.4 oz.	-15 to +50 °C
ConvertaWave™ 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

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 °C

RF Front-End

Front End Model	Transmit Frequency	Receive Frequency	Drive Level	RF Output Power (min/typ)	TX Gain (typ)	RX Gain (typ)	Supply Voltage	Current Consumption (@ 28 Vdc)	Size (L x W x H)	Weight
GPS RF Front End	1626.5 to 1675 MHz	1518 to 1559 MHz	0 dBm	20 W (min)	50 dB	47 dB	+27 to +32 V	3.25 A (typ)	10.25"x 6.00 x 0.80 in	47 oz.

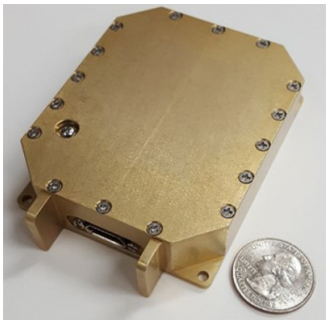


T/R Switch

T/R Switch Model	Frequency Range	Power Handling	Switch Time	Supply Voltage	Current Consumption	Size (L x W x H)	Weight	Operating Temperature
NuSwitch VU150MH01	50 to 500 MHz	150 W	4 µs	5 VDC	350 mA	3.54" x 4.20" x 0.98"	1.3 oz.	-20 to +70 ℃

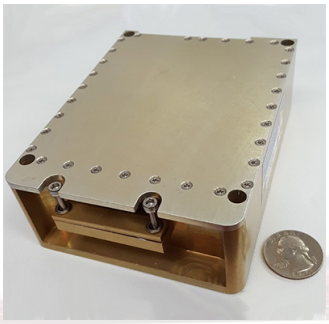
Cybersecurity Hardware Solutions

Cybersecurity has become a top priority of our nation's defense organizations and commercial counterparts. As threats to our cyber environments continue to grow and evolve, innovative technologies must be developed to combat these ever-evolving threats. Utilizing technology developed by the Air Force Research Laboratory (AFRL), NuWaves Engineering offers protection for avionics busses through the use of physical mitigation devices.



Vegas- S MIL-STD-1553 Data Diode

Vegas-S allows for the isolation of the main MIL-STD-1553 avionics bus from bus monitors or systems under test for enhanced safety of flight. This control of data flow over the MIL-STD-1553 bus provides true risk reduction to the aircraft's avionics bus for early software upgrades to existing bus monitoring systems, along with reducing the risk to the aircraft's avionics bus for early bus monitor integration. Vegas-S supports two independent MIL-STD-1553 channels (ie: one 'A' and one 'B') and comes in a 7 in^3 / 0.5 lbs package offering 40 mA at 28 VDC.



Vampire MIL-STD-1553 Anomaly Detection and Data Recording

The Vampire MIL STD 1553 Anomaly Detection and Data recording module records all of the energy on the MIL STD 1553 bus to an internal SD Card to allow for post flight and test analysis, along with playback of the recorded MIL STD 1553 traffic (using AFRL's Transfusion product). Vampire also has the capability to convert the MIL STD 1553 bus traffic to Ethernet UDP packets. It allows for real-time anomaly detection and is an additional method of recording bus traffic (external laptop needed). The module comes in a 30 in^3 / 2 lb package offering 400 mA at 28 VDC.

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.

Power Amplifiers

200 MHz to 5.85 GHz

5 W to 100 W

Miniature size – as small as 1.6 in^3

Ruggedized IP67 tactical modules available

Single- & Multi-Channel Amplifiers

225 MHz to 5.875 GHz

5 W to 25 W

Linear models for OFDM, etc.

Auto-sense T/R switching available

Low Noise Amplifiers

2 MHz to 10 GHz

20 to 50 dB of gain

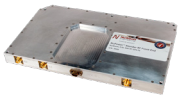
Ruggedized & lab models

Preselectors & Tuners

Fully programmable

200 MHz to 2.5 GHz

4-8% 3 dB bandwidth



RF Front End

1626.5 to 1675 transmit frequency

1518-1559 receive frequency

20 W (min) output power

47 dB receive gain

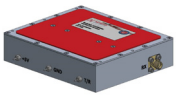
RF Frequency Conveters

Upconverters

- Programmable IF & RF
- 2 to 70 MHz IF input
- 2 MHz to 3 GHz RF output

Downconverters

- Programmable from 200 MHz to 2.5 GHz
- 70 MHz IF input
- User-selectable IF bandwidths



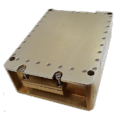
RF Switch

50 to 500 MHz

150 W Power Handling

4 µs Switch Time

CYBERSECURITY SOLUTIONS



Vampire

Ruggedized MIL-STD-1553 Data Recorder, Ethernet output

Use Cases: Anomaly Detection, Predictive Maintenance, Reverse Engineering, Real Time Secondary Display

Vegas-S

Ruggedized MIL-STD-1553 Data Diode, Two channel (A and B), Bus protection from malicious traffic

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Trusted RF Solutions™