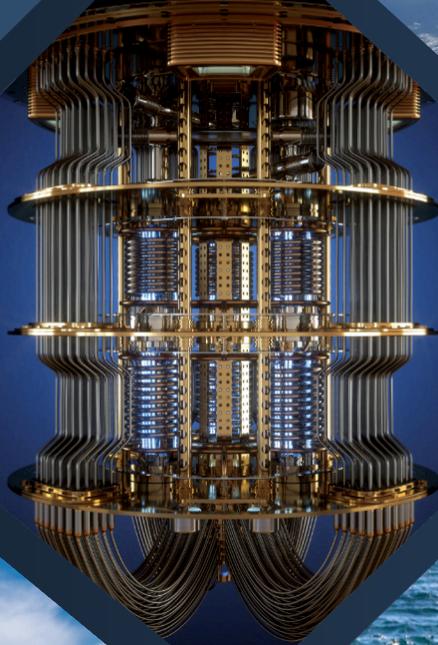




# RENAISSANCE

HF to Millimeter Wave  
Components to Sub-Systems  
Aerospace and Defense



# PRODUCT CATALOG

Version: 2.1

# About Us

Renaissance Electronics & Communications, LLC



Since its inception in 1991, Renaissance has been a pioneering force in the realm of custom RF/microwave and mmWave components and integrated systems. Our unwavering commitment to quality and reliability has made us a trusted name in the industry. Specializing in frequencies from DC to 110 GHz, we cater primarily to the space, aerospace, and defense sectors, addressing crucial wireless telecom needs.

Our cutting-edge products are integral to numerous critical platforms, spanning radar, missile systems, and communication networks. With a sprawling 16,000 square-foot facility nestled in Harvard, MA, we operate under strict ITAR regulations, ensuring compliance with stringent military standards.

Here, innovation thrives, as our expert team continually pushes boundaries to deliver solutions that redefine possibilities in the RF domain. Renowned for our precision, durability, and performance, Renaissance Electronics stands as a beacon of excellence in the realm of advanced RF technology.

## Quality Above All

Following the design and manufacturing processes and procedures of AS9100D and ISO 9001:2015, Renaissance is an approved supplier to defense and aerospace organizations worldwide.

## Renaissance Differentiation

World leader in producing mission-critical component designs. Unparalleled in SWaP play while delivering the highest reliability. Solutions that fit schedule requirements and tight budgets.

## Rigorous Analysis and Testing

TVAC/High power multipaction and corona analysis and testing. Mechanical shock and vibration, thermal shock, humidity, x-ray, DPA. *As Required*

Renowned as a global leader, we specialize in tailoring innovative solutions for high-reliability applications, meticulously crafted to meet diverse technical and environmental demands. Our clients entrust us with their most critical projects, whether it's pioneering next-generation radars, optimizing communication links, enhancing missile systems, or refining transceiver technology.

What sets us apart is our unwavering commitment to delivering excellence: top-tier quality, streamlined Size, Weight, and Power (SWaP) designs, all within budget and on schedule. It's this dedication that fosters enduring partnerships, ensuring our customers return to us time and again for their evolving needs.

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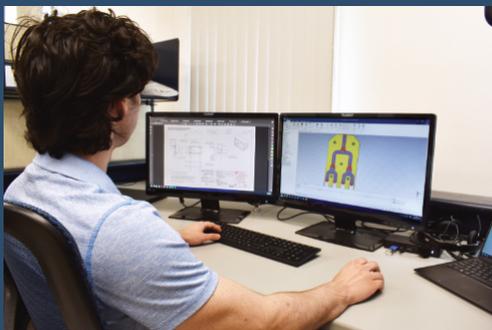


# Core Competency

## Design, Manufacturing and Testing

Renaissance Electronics is a pioneering force in RF, Microwave, and Millimeter-wave product design, renowned for its exceptional skills and utilization of cutting-edge design tools.

With a focus on custom product design, Renaissance leverages advanced manufacturing and testing capabilities to deliver unparalleled solutions.



### Core Competency – Design

Using simulation tools like HFSS, AWR, and CST, Renaissance possesses the ability to craft bespoke components and integrated assemblies, supporting the development of sub-systems across various industries.

These simulation tools enable precise design iterations and optimization, ensuring that products meet stringent performance requirements.



### Core Competency – Manufacturing

One of Renaissance's key strengths lies in its onsite testing capabilities, catering particularly to the Aerospace and Defense sectors.

The company conducts Thermal Vacuum Testing under high RF power levels, enabling thorough analysis of multipaction and corona effects, crucial considerations in these demanding applications.



### Core Competency – Testing

Furthermore, Renaissance offers a comprehensive suite of standard test capabilities, including temperature shock, mechanical vibration, temperature testing, and glitch tests.

These capabilities ensure that products withstand harsh environmental conditions and operate reliably under real-world scenarios.

In summary, Renaissance Electronics stands at the forefront of RF, Microwave, and Millimeter-wave product design, empowered by its excellent skills, state-of-the-art design tools, advanced manufacturing, and comprehensive testing capabilities. Their commitment to innovation and quality makes them a trusted partner for custom solutions in critical industries.



# Surface Mount Ferrites

Renaissance Electronics has developed state-of-the-art Surface Mount Circulators and Isolators tailored specifically for SWaP (Size, Weight, and Power) applications, particularly those requiring the handling of High Peak and Average powers within a compact footprint.

These circulators are engineered to meet the stringent demands of High Reliability applications such as Space and Defense, where reliability and performance are paramount.

Despite their diminutive size, these circulators boast a high Mean Time Between Failures (MTBF), ensuring uninterrupted operation in mission-critical environments.

One of the standout features of Renaissance's Surface Mount Ferrites is their exceptional bandwidth, offering versatility across a wide range of frequencies. This broad bandwidth, coupled with optimized RF performance, enables seamless integration into systems requiring high-performance RF components.



Part number: 3SMC3NAF

## 1.2-1.4 GHz, Surface Mount Circulator, L-Band

For use in Military Radars, this L-Band surface mount circulator handles 350W of power while maintaining high isolation and low insertion loss.



Part number: 2SMH8NAH-2-ROHS

## 8.5-9.6 GHz, Surface Mount Circulator, X-Band

For X-Band Down Converters, this surface mount isolator minimizes reflections and aids in better system level performance.



Part number: 2SMH9ND-S

## 22-25 GHz, Space Qualified SMT Isolator, K-Band

Designed specifically for K-Band, this surface mount isolator is ideal for element matching element and compatible with pick and place assembly processes.

## Surface Mount Circulators

Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
3SLE2NAR	0.3 - 0.31 GHz	1 dB	17 dB	1.50:1	10 W	0° - +55°	.394 X .394 X .275
3SLE2NAJ	0.42 - 0.45 GHz	0.8 dB	15 dB	1.40:1	10 W	0° - +55°	.394 X .394 X .28
3SMC3NF-ROHS	0.95 - 1.225 GHz	0.4 dB	18 dB	1.38:1	50 W	-20° - +60°	1.068 X 1.07 X .345
3SMC3NAF	1.2 - 1.4 GHz	0.3 dB	20 dB	1.20:1	350 W	-45° - +85°	1.07 X .818 X .345
3SMC3NM	1.03 - 1.09 GHz	0.35 dB	20 dB	1.30:1	4 W	-40° - +85°	1.07 X 1.07 X .345
3SMC3NK	1.55 - 1.65 GHz	0.5 dB	20 dB	1.25:1	10 W	-40° - +85°	1.07 X 1.07 X .345
3SMC5BD	2.7 - 3.7 GHz	0.7 dB	15 dB	1.43:1	25 W	-5° - +60°	1.08 X 1.08 X .38
3SMC3NY	3.5 - 4.5 GHz	0.4 dB	18 dB	1.30:1	50 W	-32° - +85°	0.750 X 1.04 X 0.30
3SMH6NGL	4.2 - 4.4 GHz	0.5 dB	20 dB	1.25:1	5 W	-55° - +70°	.561 X .561 X .20
3SMC7NA	4.9 - 6.25 GHz	0.6 dB	20 dB	1.25:1	30 W	-40° - +85°	.75 X .75 X .25
3SMH7NB	7.4 - 7.9 GHz	0.5 dB	20 dB	1.20:1	100 W	-40° - +71°	.60 X .60 X .23
3SMH8NAKL	9.2 - 10.8 GHz	0.35 dB	18 dB	1.35:1	5 W	-25° - +95°	.350 X .350 X .191
3SMH8ND	9.3 - 9.4 GHz	0.6 dB	20 dB	1.25:1	60 W	-55° - +85°	.630 X .615 X .22
3SMH8BGL	8 - 11 GHz	0.6 dB	18 dB	1.35:1	25 W	-40° - +90°	.350 X .358 X .191
3SMH8NAM	8.7 - 8.9 GHz	0.6 dB	17 dB	1.33:1	1 W	-40° - +90°	.350 X .358 X .191
3SMH8NH	9 - 9.6 GHz	0.7 dB	17 dB	1.35:1	10 W	-40° - +85°	.63 X .615 X .22
3SMH9NA	14 - 16 GHz	0.6 dB	20 dB	1.25:1	1 W	-55° - +100°	.35 X .457 X .191

## Surface Mount Isolators

Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
2SLE2NCT	0.758 - 0.803 GHz	0.8 dB	15 dB	1.40:1	5 W	-10° - +80°	.394 X .394 X .275
2SLE2NDFL	0.9611 - 1.0149 GHz	0.8 dB	17 dB	1.50:1	2 W	0° - +55°	.394 SQ X .180
2SMC3NBL	1.455 - 1.515 GHz	0.3 dB	20 dB	1.20:1	30 W	0° - +85°	.845 X .750 X .25
2SMC5BD	2.7 - 3.7 GHz	0.7 dB	15 dB	1.43:1	25 W	-5° - +60°	.50 X 1.24 X .50
2SMH5BA	2.8 - 3.6 GHz	0.6 dB	15 dB	1.43:1	25 W	-5° - +60°	0.75 SQUARE X 0.35
2SMH5BA	3 - 3.55 GHz	0.4 dB	20 dB	1.20:1	25 W	-5° - +60°	0.75 SQUARE X 0.35
2SMH7NA-S	7.3 - 8 GHz	0.6 dB	20 dB	1.3:1	2 W	-20° - +85°	.615 X .630 X .222
2SMH8ND	9.3 - 9.5 GHz	0.35 dB	20 dB	1.25:1	10 W	-55° - +100°	.475 X .350 X .191
2SMH8NW-ROHS	9.5 - 11.5 GHz	0.4 dB	20 dB	1.25:1	1 W	-25° - +65°	.457 X .350 X .191
2SMH9NA-ROHS	13.75 - 14.5 GHz	0.4 dB	20 dB	1.25:1	1 W	-25° - +65°	.457 X .350 X .191
2SMH9NC-ROHS	14.6 - 15.3 GHz	0.5 dB	20 dB	1.25:1	2 W	-40° - +85°	.457 X .350 X .191
2SMH9ND-S	22 - 25 GHz	0.8 dB	18 dB	1.43:1	2 W	-40° - +85°	.457 X .350 X .191
2W9NCQ-S	17.3 - 18.6 GHz	0.8 dB	17 dB	1.30:1	1 W	-25° - +85°	.500 X .236 X .150
2W9NCR-S	18.3 - 20.2 GHz	0.8 dB	17 dB	1.30:1	1 W	-25° - +85°	.500 X .236 X .150
2W9NDJL	29 - 31 GHz	1 dB	19 dB	1.30:1	2 W	-40° - +70°	.20 X .20 X .10

# Coaxial Circulators

Our circulators lead the industry, spanning frequencies from 80 MHz to 110 GHz. These designs offer an array of capabilities, including high power handling and multi-octave bandwidths, for Hi-Rel applications.

For space applications, proper design margins are established to offer highest reliability under power and vacuum conditions. Potted and hermetic designs are available.

The most optimum temperature compensation circuitry are designed for broadband and with high power handling capability requirements to ensure highest MTBF in the most compact form factor.

## 2.2-2.4 GHz, Coaxial Circulator, S-Band



Part number: 3A4NPE

This circulator operates within the 2.2-2.4 GHz frequency range, featuring a G-S-G construction on Ports 1 and 3 and an extended SMA on port 2. It sustains 30W forward and reverse power without multipaction and corona discharge.

Specifications include: Insertion Loss: 0.5 dB, Isolation: 20 dB, VSWR: 1.25 : 1, Temperature Range: -45°C to 90°C, and Size: 1.08" x 1.06" x .75". Key features comprise G-S-G construction on ports 1 and 3, compact size, optimized match reducing VSWR parasitic effects, suitability for space communications, and enhancing system performance while reducing overall weight.

## 6.2-18 GHz, Coaxial Circulator, X-Band



Part number: 3A9BBB

Renaissance introduces a compact, high-power coaxial circulator designed for diverse applications such as electronic warfare, radar, communication links, and test instrumentation.

Capable of handling 150 watts CW across 6.2-18 GHz, it boasts the following specifications: Frequency: 6.2-18 GHz, Insertion Loss: 1.0 dB, VSWR: 1.67:1, Isolation: 12 dB, Temperature Range: -40°C to 80°C, and Size: .63" x .75" x .5".

Key features include high power handling, 97% operational bandwidth, and suitability for various critical applications.

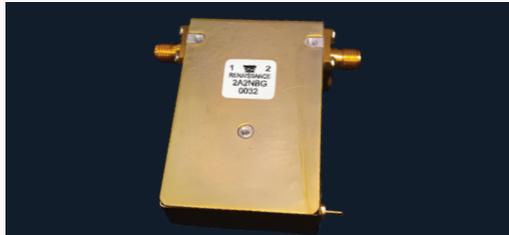
Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
3A1NDK-S	0.24 - 0.27 GHz	0.5 dB	20 dB	1.18:1	150 W	-25° - +80°	2.88 X 2.88 X 1.12
3A2BC	0.225 - 0.4 GHz	0.9 dB	16 dB	1.40:1	40 W	-25° - 40°	2.56 X 2.05 X 1.14
3A1NCX	0.35 - 0.38 GHz	0.5 dB	20 dB	1.25:1	125 W	-30° - +71°	1.67 X 1.50 X 1.01
3A2NGH	0.412 - 0.445 GHz	0.2 dB	20 dB	1.25:1	500 W	0° - +70°	2.9 X 2.8 X 1.4
3A2NHR	0.42 - 0.45 GHz	0.5 dB	20 dB	1.25:1	20 W	-10° - 65°	1.50 X 1.67 X 1.01
3A2NGZ	0.4 - 0.6 GHz	0.4 dB	16 dB	1.25:1	300 W	0° - +50°	2.38 X 2.25 X 1.0
3A2NHY-S	0.6 - 0.9 GHz	0.5 dB	16 dB	1.25:1	25 W	-40° - +85°	2.00 X 2.12 X .68
3A2BFC	0.7 - 0.96 GHz	0.7 dB	15 dB	1.60:1	150 W	-40° - +75°	1.50 X 1.67
3A2BAE	0.7 - 1 GHz	0.7 dB	16 dB	1.4:1	500 W	-40° - +85°	1.50 X 1.67 X 1.01
3A2NGP	0.895 - 0.935 GHz	0.035 dB	30 dB	1.20:1	100 W	-35° - +85°	1.67 X 1.50 X 1.01
3A2NGW	0.9 - 1.5 GHz	0.6 dB	16 dB	1.50:1	50 W	-20° - +85°	2.6 X 2.6 X .75
3A2NHT	0.96 - 1.215 GHz	0.4 dB	18 dB	1.30:1	300 W	-20° - +65°	1.50 X 1.67 X 1.01
3A2NJC	0.95 - 1.15 GHz	0.5 dB	17 dB	1.33:1	100 W	-10° - +70°	-1.50 X 1.67 X 1.01
3A2NJC	1.03 - 1.09 GHz	0.3 dB	20 dB	1.2:1	300 W	-10° - +70°	1.50 X 1.67 X 1.01
3A3NBM	1.02 - 1.1 GHz	0.5 dB	20 dB	1.25:1	100 W	-10° - 60°	1.67 X 1.50 X 1.01
3A3NBH	1.2 - 1.35 GHz	0.5 dB	18 dB	1.25:1	75 W	-20° - +85°	1.67 X 1.50 X 1.01
3A3NH	1.25 - 1.4 GHz	0.3 dB	20 dB	1.25:1	300 W	-40° - 85°	1.5 X 1.67 X 1.01
3A4BN	1.35 - 2.7 GHz	0.5 dB	14 dB	1.4:1	50 W	-40° - +85°	2.6 X 2.6 X .75
3A4NPP	1.6 - 1.8 GHz	0.5 dB	20 dB	1.25:1	500 W	-20° - +70°	1.66 X 1.50 X 1.00
3A4NFB	2.2 - 2.24 GHz	0.5 dB	20 dB	1.25:1	75 W	-45° - +95°	1.2 X 1.06 X 1.06
3A5BAF	2.5 - 3.5 GHz	0.6 dB	18 dB	1.29:1	500 W	-20° - +70°	1.66 X 1.50 X 1.01
3A7NX	6.9 - 7.1 GHz	0.4 dB	20 dB	1.25:1	30 W	-40° - +85°	.75 X .75 X .50
3A5BA	6 - 1.2 GHz	0.6 dB	18 dB	1.30:1	60 W	-30° - +80°	1.62 X 1.72 X .69
3A8BXL	7 - 12.4 GHz	0.6 dB	23 dB	1.25:1	10 W	-10° - +70°	1.06 X 1.26 X .83
3B9BC	8 - 14 GHz	0.75 dB	15 dB	1.50:1	100 W	0° - +65°	1.05 X 0.56 X 0.5
3A8NAH	9 - 10 GHz	0.5 dB	20 dB	1.25:1	100 W	0° - +60°	.50 X .62 X .50
3A8NAZ	8.5 - 9.6 GHz	0.4 dB	20 dB	1.25:1	75 W	0° - +70°	0.75 X 0.75 X 0.5
3A8NBD	9.2 - 9.8 GHz	0.4 dB	20 dB	1.25:1	40 W	-45° - +75°	.50 X .62 X .50
3A8NBQ	9.2 - 9.8 GHz	0.3 dB	20 dB	1.25:1	100 W	0° - +60°	.50 X .62 X .50
3A8NBR	9 - 10 GHz	0.5 dB	20 dB	1.25:1	200 W	0° - +60°	.50 X .62 X .50
3A9BAQ	8 - 18 GHz	0.7 dB	16 dB	1.40:1	50 W	-35° - +70°	.60 X .50 X .50
3A9BK	12 - 18 GHz	0.5 dB	20 dB	1.25:1	65 W	-30° - +80°	.50 X .62 X .50
3A9NAE	22 - 26 GHz	0.5 dB	18 dB	1.29:1	10 W	-20° - +70°	.55 X .50 X .38

# Coaxial Isolator

Our isolators excel in Hi-Rel applications, setting the industry standard through continuous design evolution.

We analyze both reflected and incident power levels to ensure optimal performance. The magnetic circuit is engineered with a focus on thermal junction temperatures and compensation techniques.

This ensures stability in RF performance across the operating frequency band and varying temperatures.



Part number: 2A2NBS

## 69-894 MHz, Coaxial Isolator, UHF Band

With a built-in reflected power monitor, this isolator produces 1 VDC @ 30W reflected. This feature is also available in other frequency bands.



Part number: 2A4NGG-S

## 2.2-2.3 GHz, Space Grade, Coaxial Isolator, S-Band

For satellite communication links, Renaissance has designed a high power, compact isolator that is low loss over a wide band UHF frequency range.

Renaissance Electronics' coaxial isolators excel due to their exceptional performance, precision engineering, and reliability.

They offer high isolation, low insertion loss, wide bandwidth, and robust construction, ensuring optimal signal integrity and protection against unwanted reflections or interference.



Part number: 2A7NFC-S

## 7.8-8.4 GHz, Coaxial Isolator, C-Band

Designed to meet the challenging requirements of satellite applications, this is a space grade, isolator with optimized loss and 10W power handling.



Part number: 2A9BDT

## 18-27 GHz, Coaxial Isolator, K-Band

Designed for deep space missions and with low outgassing materials in a robust package, this isolator has ~ 0.5 dB over the entire K-Band.

Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
2A1NAC	0.125 - 0.155 GHz	1.0 dB	14 dB	1.50:1	10 W	0° - +60°	2.8 X 2.9 X 1.14
2A1NAJ	0.25 - 0.27 GHz	0.4 dB	20 dB	1.25:1	150 W	+15° - ++35°	2.8 X 2.9 X 1.14
2A1NAF	0.359 - 0.42 GHz	0.5 dB	20 dB	1.25:1	20 W	0° - +50°	2.8 X 2.9 X 1.14
2A1NAM	0.4 - 0.45 GHz	0.4 dB	20 dB	1.25:1	10 W	-40° - +65°	2.8 X 2.9 X 1.14
2A2NAAE	0.65 - 0.75 GHz	0.5 dB	17 dB	1.35:1	10 W	0° - +70°	1.25 X 1.25 X .5
2A2NER	0.9 - 0.93 GHz	0.5 dB	20 dB	1.20:1	10 W	+10° - +60°	1.50 X 1.67 X 1.01
2A3BAA	0.95 - 1.5 GHz	0.5 dB	17 dB	1.35:1	10 W	0° - +50°	2.6 X 2.6 X 0.75
2A3NBN	1.0 - 1.4 GHz	1.0 dB	14 dB	1.50:1	20 W	-40° - +80°	1.50 X 1.67 X 1.01
2A3NBQ-DF	1.43 - 1.70 GHz	0.5 dB	18 dB	1.30	10 W	-54° - +85°	1.50 X 1.67 X 1.01
2A3NAN	1.74 - 1.85 GHz	0.4 dB	20 dB	1.25:1	20 W	0° - +80°	1.50 X 1.67 X 1.01
2A3BX	1.9 - 2.3 GHz	0.4 dB	20 dB	1.22:1	10 W	+15° - +50°	1.00 X 1.00 X 0.50
2A4BW	1.0 - 2.0 GHz	.06 dB	16 dB	1.36:1	300 W	-40° - +80°	3.00 X 2.98 X 1.02
2A4NDO	2.0 - 2.3 GHz	0.6 dB	17 dB	1.40:1	10 W	-54° - +95°	0.75 X 0.75 X 0.5
C1-S15337	2.11 - 2.75 GHz	0.6 dB	15 dB	1.5:1	64 W	-10° - +60°	1.7 X 1.5 X 6.7
2D5BDL	2.9 - 3.1 GHz	1.0 dB	40 dB	1.30:1	10 W	0° - +65°	3.0 X 1.61 X .880
2A5BAB-DF	2 - 4 GHz	0.5 dB	20 dB	1.30:1	15 W	10° - +60°	1.61 X 1.61 X .80
2A5NDF	5.4 - 5.9 GHz	0.4 dB	20 dB	1.25:1	60 W	0° - +50°	1.24 X 1.24 X .76
2A6BD	3.0 - 6.0 GHz	0.5 dB	18 dB	1.30:1	10 W	0° - +70°	1.00 X 1.00 X 0.5
2A7BH	4 - 8 GHz	0.5 dB	18 dB	1.30:1	20 W	0° - +50°	1.00 X 1.13 X .50
2A8BG	8 - 12.4 GHz	0.5 dB	20 dB	1.25:1	10 W	-40° - +95°	.50 X .62 X .5
2A8BBQ	7 - 11 GHz	0.5 dB	20 dB	1.25:1	10 W	-40° - +85°	.75 X .75 X .5
2A8NBH	8.4 - 10.0 GHz	0.5 dB	20 dB	1.25:1	20 W	-54° - +71°	.50 X .62 X .50
2A8NAH	9.5 - 10.5 GHz	0.5 dB	20 dB	1.25:1	10 W	-30° - +60°	.50 X .62 X .50
2A8NBJ	10.0 - 11.0 GHz	0.4 dB	20 dB	1.25	10 W	-30° - +70°	.50 X .62 X .50
2A9BF-1	15 - 23 GHz	1.5 dB	14 dB	1.45:1	10 W	0° - +70°	.50 X .62 X .50
2A9NDX	11.0 - 14.5 GHz	0.4 dB	20 dB	1.20:1	10 W	-20° - +70°	.50 X .62 X .50
R2A9NJN	17.0 - 22.0 GHz	0.5 dB	16 dB	1.30:1	10 W	-20° - +75°	.50 X .62 X .50
2A9NNW	25.5 - 31.0 GHz	1.0 dB	14 dB	1.50:1	20 W	-10° - +65°	.500 X .500 X .320
2SMH9ND-S	14.5 - 15.5 GHz	0.4 dB	20 dB	1.25:1	10 W	-40° - +85°	.50 X 1.24 X .50
2A9NNX	25.3 - 27.2 GHz	0.8 dB	17 dB	1.40:1	40 W	-40° - +65°	.830 X .500 X .320
2A9NFH-RoHS	27.0 - 31.0 GHz	1.0 dB	16 dB	1.50:1	20 W	-30° - +70°	.50 x .58 x .40

# Drop-in Circulators

Our designs provide the highest bandwidth and power handling, ensuring highest MTBF.

Ferrite compositions are tailored specifically for mitigating non-linearities due to power and altitude.

- SWaP designs available from VHF to W band
- Highest power ratings and best-in-class performance
- Space and other Hi-Rel applications
- Octave and higher bandwidths available
- Custom configurations
- RoHS compatible



Part number: 3G3NYL

## 1.3-1.4 GHz, Drop-in Circulator, L-Band

Tailored for ground based radars, this circulator features two distinct input pin ports compatible for a PCB launch. The 3rd port is a standard SMA Female. Engineered to endure high peak powers, it ensures robust performance in demanding conditions.



Part number: 3G2BAC-S

## 960-1215 MHz, Drop-In Circulator, UHF

For aeronautical radionavigation services (ARNS) covering DME, TACAN, SSR, IFF, JTIDS/MIDS applications Renaissance has designed a high peak and average handling drop-in circulator that covers 960-1215 MHz with low loss and is highly temperature stable.



Part number: 3G9NAP

## 24.0-24.25 GHz, Drop-In Circulator, K-Band

This K-Band drop-in circulator, operating at 24-24.25 GHz is designed for the 1.2-centimeter band. This band has been internationally allocated to amateur radio and satellite use and is widely used in police radar and satellite communication.

Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
3G2NFE	0.406 - 0.45 GHz	0.5 dB	18 dB	1.3:1	90 W	0° - +45°	1.38 x 1.38 x .63
3G2BF	0.5 - 0.69 GHz	0.7 dB	14 dB	1.5:1	350 W	-20° - +95°	2.15 x 2.125 x 0.63
3G2BG	0.69 - 1.1 GHz	0.5 dB	15 dB	1.40:1	350 W	-20° - +95°	2.125 X 2.125 X.63
R3G2NEW-ROHS	0.9 - 0.98 GHz	0.3 dB	23 dB	1.25:1	1500 W	-20° - +60°	1.25 X1.25 X.365
E2NAAL	1.02 - 1.1 GHz	0.4 dB	22 dB	1.20:1	100 W	-40° - +85°	1.25 X1.25 X.365
R3G3NCE	1.2 - 1.4 GHz	0.5 dB	20 dB	1.25:1	300 W	-40° - +85°	1.00 x 1.00 x .26
3G2BDL	0.962 - 1.213 GHz	0.5 dB	17 dB	1.33:1	20 W	-55° - +120°	1.38 X 1.38 X .63
3G3NAG	1.000 - 1.120 GHz	0.2 dB	23 dB	1.15:1	50 W	-	1.25 X1.25 X.365
3G3NCG	1.03 - 1.09 GHz	0.3 dB	18 dB	1.25:1	75 W	-40° - +70°	1.25 X1.25 X.365
3G3BM	1.1 - 1.7 GHz	0.6 dB	18 dB	1.25:1	900 W	-10° - +50°	1.25 X1.25 X.35
3G3BK	1.3 - 1.85 GHz	0.6 dB	20 dB	1.28:1	300 W	-40° - +85°	1.00 x1.00 X.300
3G4NBN	1.7 - 1.9 GHz	0.5 dB	20 dB	1.25:1	60 W	-40° - +85°	.750 SQ X.30
3G4NFC	1.75 - 2.11 GHz	0.4 dB	20 dB	1.20:1	800 W	-55° - +110°	.875 X .875 X .345
3G4NFH	2.4 - 2.5 GHz	0.3 dB	20 dB	1.20:1	1200 W	-10° - +70°	.750 X.750 X.220
3G5BG	2.3 - 2.8 GHz	0.7 dB	14 dB	1.50:1	90 W	-20° - +95°	.875 X .875 X .345
3G5NAJ	2.9 - 3.3 GHz	0.6 dB	19 dB	1.25:1	250 W	-	0.75 X0.75 X0.3
3G5NBH	2.7 - 2.9 GHz	0.35 dB	20 dB	1.25:1	250 W	0° - +40°	.750 X.750 X.300
3G5BG	2.30 - 3.80 GHz	0.7 dB	14 dB	1.50:1	90 W	-20° - +95°	.875 X .875 X .345
3G6BEL-1	2.5 - 6.0 GHz	1.0 dB	10 dB	2:1	100 W	-40° - +95°	1.02 X 1.02 X 0.35
3G7BN	4.0 - 6.0 GHz	0.25 dB	18 dB	1.25:1	50 W	-40° - +55°	.75 x .75 x .30
3G6NAT-S	5.75 - 5.85 GHz	0.3 dB	20 dB	1.25:1	100 W	-30° - +80°	.500 X .500 X.180
3G7BP	5.4 - 7.6 GHz	1.0 dB	10 dB	2:1	50 W	-20° - +95°	0.850 x .85 x .33
3G8BAE	8 - 11 GHz	0.5 dB	16 dB	1.40:1	25 W	-40° - +80°	.35 x .475x .18
3G9BEL	12 - 18 GHz	0.6 dB	16 dB	1.40:1	50 W	-40° - +80°	0.5 x 0.5 x .19
R3G9NAF	15.0 - 16.0 GHz	0.5 dB	20 dB	1.25:1	5 W	-10° - +85°	.500 X .500 X .18
3J9NA	17.5 - 20 GHz	0.7 dB	18 dB	1.3:1	30 W	-40° - +80°	dia .250 x .12
3G9NAP	24 - 24.25 GHz	0.7 dB	16 dB	1.4:1	20 W	-10° - +70°	.25 x .25 x .15

# Drop-in Isolators

Our isolator design leads the industry, meticulously analyzing both reflected and forward power for optimal performance.

Thermal considerations are paramount, computed with advanced simulation tools like Spark3D, guarding against multipaction and corona effects in high-power and altitude scenarios.

For space applications, low outgassing materials are employed. Custom resistors and terminations ensure precise application fit, including reverse power monitoring. Temperature compensation circuitry stabilizes against rapid temperature changes, ensuring consistent performance across various conditions.



Part number: 2H3BG

## 1.1-1.6 GHz, Drop-in Isolator, L-Band

Introducing Renaissance's L-Band drop-in isolator, designed for satellite navigation, telecom, and aircraft surveillance. Operating at 1.1-1.6 GHz, with a low insertion loss of 1.0 dB and high isolation of 15 dB, it ensures efficient signal transmission.

With a VSWR of 1.43:1 and the capability to handle 10W of continuous wave power, it maintains signal integrity. Its wide temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  ensures reliability in varied environments. Compact at  $1.00'' \times 1.00'' \times .148''$ , it's an optimal choice for space-constrained applications.



Part number: 2H8BAM

## 9.0-18.25 GHz, Drop-In Isolator, Ku-Band

Introducing Renaissance's Ku-Band drop-in isolator, tailored for air, land, and maritime satellite and radar communication. Covering a broad frequency range of 9.0-18.25 GHz, this isolator offers versatile protection for both X and Ku-Band amplifiers.

With an insertion loss of 1.0 dB and isolation of 11 dB, it ensures efficient signal transmission. Its VSWR of 1.60:1 and ability to handle 10W of continuous wave power (with 5W reverse power) make it a robust choice. Operating in temperatures ranging from  $-25^{\circ}\text{C}$  to  $65^{\circ}\text{C}$ , it guarantees reliability across various environments. Compact at  $.500'' \text{ SQ} \times .210''$ , it's perfect for space-efficient installations.

Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
2H2NHF	0.96 - 1.215 GHz	0.4 dB	20 dB	1.25	4 W	-55° - +85°	1.00 X 1.00 X .30
2H2NFG	1.020 - 1.040 GHz	0.4 dB	20 dB	1.20:1	100 W	-35° - +70°	1.00 X 1.00 X 0.30
2H3BG	1.1 - 1.6 GHz	1.0 dB	15 dB	1.43:1	1 W	-40° - +85°	1.00 X 1.00 X .148
2H4NEW	1.6 - 1.8 GHz	0.5 dB	20 dB	1.25:1	50 W	-30° - +70°	0.750 X0.750 X 0.30
2H4NMB	1.805 - 1.880 GHz	0.4 dB	21 dB	-	60 W	-10° - +70°	1.00 x 1.25 x .32
2H4NPX	2.371 - 2.384 GHz	0.5 dB	22 dB	1.25:1	35 W	-54° - +100°	.750 X .825 X .240
2H7BZL	3.7 - 8 GHz	0.7 dB	16 dB	12:1	1 W	-45° - +71°	.750 X .750 X 0.25
2K6NY	4.2 - 4.4 GHz	0.5 dB	20 dB	1.25:1	2 W	-55° - +85°	.620 X .375 X .20
2H7BW	5.0 - 7.0 GHz	0.5 dB	20 dB	1.25:1	1 W	-20° - +70°	.750 X .750 X .27
2H7NEH-ROHS	7.9 - 8.5 GHz	0.5 dB	20 dB	1.20:1	50 W	-35° - +75°	.500 X.500 X .18
2H7NDQ-S	7.9 - 8.4 GHz	0.5 dB	20 dB	1.25:1	25 W	-40° - +85°	.500 X .750 X .18
2H8BAK	6.75 - 14.0 GHz	0.9 dB	16 dB	1.4:1	5 W	-25° - +65°	.75 SQ X .25
2H8BAC	7.5 - 18.0 GHz	1.0 dB	11 dB	2.0:1	2 W	0° - +85°	.25 X .25 X .125
2H8BAM	9.0 - 18.25 GHz	1.0 dB	11 dB	1.60: 1	5 W	-25° - +65°	.500 SQ X 210
2K7NAA	7.05 - 8.50 GHz	0.4 dB	18 dB	1.25:1	10 W	-40° - +70°	.620 X .375 X .18
2K8NAC	8.0 - 10.25 GHz	.05 dB	20 dB	1.30:1	1 W	0° - +80°	.620 X .375 X .21
2K8NK	10.1 - 10.7 GHz	0.5 dB	20 dB	1.22:1	1 W	-20° - +70°	.475 X .350 X .17
2K9NAX	13.3 - 13.35 GHz	0.4 dB	22 dB	1.25:1	5 W	-40° - +85°	.475 X .350 X .19
2L9BBL	13.0 - 18.5 GHz	1.0 dB	14 dB	1.50:1	5 W	-55° - +90°	.500 X .250 X .150
2L9NGTL-ROHS	13.75 - 14.5 GHz	0.5 dB	20 dB	1.25:1	5 W	-55° - +85°	.250 X .15 X .500
2L9NGU	15.75 - 17.25 GHz	0.7 dB	20 dB	1.25:1	5 W	-55° - +85°	.500 X .250 X .135
2L9NHE-ROHS	17.7 - 18.7 GHz	0.5 dB	22 dB	1.25:1	5 W	-30° - +70°	.25 X.50 X .15
2L9NHF-ROHS	18.5 - 19.5 GHz	0.5 dB	22 dB	1.25:1	5 W	-30° - +70°	.25 X .50 X .15
2L9NHD-ROHS	19.2 - 20.2 GHz	0.5 dB	22 dB	1.25:1	5 W	-30° - +70°	.25 X.50 X .15
2L9NHG-ROHS	20.2 - 21.2 GHz	0.8 dB	22 dB	1.25:1	5 W	-30° - +70°	.25 X.50 X .15
2L9NJA-ROHS	24.0 - 27.0 GHz	0.5 dB	16 dB	1.20:1	7 W	-40° - +85°	.500 X .250X .150
2L9NJR	25.5 - 27.0 GHz	0.5 dB	16 dB	1.2:1	7 W	-30° - +70°	.250 X .500 X .150
2L9NHY-ROHS	25.8 - 27.2 GHz	1.0 dB	18 dB	1.35:1	1 W	-40° - +85°	.250 X .500 X .150
2L9NAT-ROHS	24.0 - 27.0 GHz	1.0 dB	16 dB	1.4:1	5 W	-40° - +70°	.250 X .500 X .150
2L9NGK-ROHS	27.0 - 30.0 GHz	1.0 dB	16 dB	1.35:1	1 W	-40° - +85°	.250 X .500 X .150
2L9NJS-ROHS	27.0 - 31.0 GHz	0.7 dB	17 dB	1.33:1	5 W	-40° - +85°	.50 X .25 X .15
2L9NFU-ROHS	28 - 30 GHz	1.0 dB	16 dB	1.40:1	5 W	-40° - +85°	0.25 X 0.5 X 0.15
2L9NEU - ROHS	30 - 33 GHz	1.0 dB	16 dB	1.38:1	40 W	-20° - +60°	0.25 X 0.5 X 0.15

# Waveguide Circulators

Introducing custom RF circulators covering 1-50 GHz, available in 3-port and 4-port configurations. Designed for high peak and average power, with options for convection or liquid cooling.

Ideal for land, mobile, naval, and airborne environments in scientific, medical and radar applications.



Part number: 3WR284NA-1

## 2.7-2.9 GHz, 3-Port Circulator, S-Band

Introducing an S-Band 3-port circulator in WR284, ideal for military and commercial applications like air traffic control, ground-based, and ship-borne radars. It handles high power with minimal insertion loss.



# Waveguide Isolators

Renaissance's Waveguide Isolators excel in size, weight, and power handling. Engineered for high reliability in military radars, satellite comms, and medical use.

Expertise in ferrite materials ensures highest device MTBF, making them prime choices for defense and aerospace programs.



Part number: 2WR34NA

## 27.5-31 GHz, Space Qualified Waveguide Isolator, Ka-Band

Renaissance introduces a Ka-Band waveguide isolator for space downconverters. Operating from 27.5-31 GHz, it offers 0.15 dB insertion loss, 20 dB isolation, and handles 1W power.



Part Number	Frequency	Loss	Isolation	VSWR	Power (Avg)	Temperature	Size (inches)
3WR284	2.8 - 3.1 GHz	0.5 dB	20 dB	1.25:1	1000 W	-40° - +85°	10.00 x 10.00 x 3.00
3WR90-1	10.35 - 10.7 GHz	0.2 dB	25 dB	1.15:1	100 W	-30° - +60°	2.00 x 2.40 x 1.60
2WR75-15	10.7 - 12.75 GHz	0.3 dB	20 dB	1.20:1	10 W	-40° - +85°	2.25 X 1.50 X 1.50
2WR62-4	14.0 - 14.5 GHz	0.3 dB	20 dB	1.20:1	15 W	-40° - +95°	1.50 X 1.31 X 1.5
2WR51-5H-ROHS	17.8 - 19.3 GHz	0.3 dB	20 dB	1.30:1	4 W	-20° - +70°	1.189 X 1.484 X 0.435
R2WR426-1	20.2 - 21.2 GHz	0.2 dB	26 dB	1.15:1	3 W	-40° - +80°	1.5 x .88 x .5
2WR42-10	19.0 - 21.0 GHz	0.3 dB	18 dB	1.3:1	10 W	-40° - +85°	1.5 X .875 X .890
2WR34-5	24.25 - 27.0 GHz	0.15 dB	20 dB	1.15:1	1 W	-25° - +71°	.75 X 1.20 X .50
2WR34-6	27 - 31 GHz	0.15 dB	20 dB	1.15:1	1 W	-25° - +71°	.75 X 1.20 X .50
2WR34NA	27.5 - 31 GHz	0.15 dB	20 dB	1.20:1	1 W	-80° - +70°	1.1 X 1.1 X 0.875
2WR22-10	40.0 - 42.0 GHz	0.4 dB	20 dB	1.4:1	1 W	-20° - +70°	1.024 X 0.752 X 0.394
2WR22NB	43.0 - 46.0 GHz	0.5 dB	18 dB	1.30:1	0.5 W	-40° - +70°	1.18 x 1.34 x 0.50
2WR22NF	43 - 46 GHz	0.5 dB	18 dB	1.30:1	0.5 W	-40° - +70°	1.34 X 1.18 X .50
R2WR426-1	20.2 - 21.2 GHz	0.2 dB	26 dB	1.15:1	3 W	-40° - +80°	1.50 x .88 x 0.50
20IA3NA	1.25 - 1.35 GHz	0.2 dB	20 dB	1.10	5 W	-10° - +50°	8.00 X 8.70 X 5.50
HMI28-599	33 - 37 GHz	0.4 dB	22 dB	1.25	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMI19-383-49.5-5.0	47 - 52 GHz	0.5 dB	20 dB	1.25	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMI15-385-60.5-7.0	57 - 64 GHz	0.9 dB	18 dB	1.4	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMI12-387-73.5-5.0	71 - 76 GHz	0.5 dB	18 dB	1.4	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMI12-387-78.5-5.0	76 - 81 GHz	0.5 dB	18 dB	1.4	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMI12-387-83.5-5.0	81 - 86 GHz	0.5 dB	18 dB	1.4	2 W	-35° - +75°	1.25 x 0.75 x 0.75
HMC10-387-94.0-4.0	92 - 96 GHz	0.5 dB	18 dB	1.4	2 W	-35° - +75°	1.25 x 0.75 x 0.75

# Active and Passive Multipliers

We offer multipliers spanning 20-100 GHz, employing a blend of MMIC and discrete diodes to design multiplication factors ranging from X2-X8, users gain versatility for varied applications.

These multipliers permit cascading of basic circuits for higher multiplication orders.

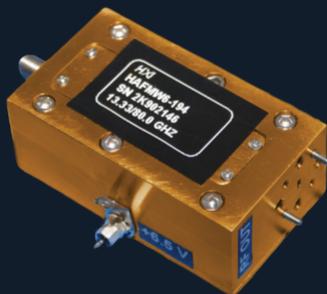
- Features a voltage regulator and bias sequencer
- Power management by utilizing a single bias voltage
- Designed for LO chains for radars and comms systems



Part number: HMM3E-026

## WR-12x3, Passive Multiplier 60-90 GHz, E-Band

Our premium X3 multiplier excels at converting Ka-Band frequencies to the 60-90 GHz range, ensuring peak performance with an output power of 7 dBm and a typical efficiency of 3%. Designed for WR-12 waveguides, it features a K-Type female input connector and a WR-12 UG387/U-M output flange, operating seamlessly without the need for bias. Handling input frequencies between 20-30 GHz, this multiplier delivers outputs of 60-90 GHz with conversion losses under 20 dB. Ideal for high-frequency applications, it combines efficiency and ease of integration for superior performance.



Part number: HAFMW6-194

## W-Band x6 Active Multiplier

Our advanced x6 multipliers revolutionize radar and communication links by effortlessly converting Ku-Band signals to the W-Band. Engineered for peak efficiency, they maintain optimal power levels, delivering exceptional reliability in the most demanding applications. With a 13 GHz input at 13 dBm, our multipliers produce an impressive 80 GHz output at 16 dBm, all while operating with a bias of just 6.5V and drawing only 550 mA. These multipliers are perfect for point-to-point communication links, ensuring unparalleled reliability and an extended device lifespan, making them indispensable for critical operations.

## Active Multipliers

Part Number	Input / Output Frequency	Input connector	Output Connector	Mult Factor	P <sub>IN</sub>	Output Power
HAFMK2-185	9.0 - 13.25 / 18.0 - 26.5 GHz	2.9 mm F	WR-42 / UG-595/U	X2	+3 dBm	+10 dBm
HAFMK2-X	9.0 - 13.25 / 18.0 - 26.5 GHz	2.9 mm F	WR-42 / UG-595/U	X2	+10 dBm	+27 dBm
HAFMA2-116	12.0 - 16.5 / 24.0 - 33.0 GHz	2.9 mm F	2.9 mm F	X2	+10 dBm	+15 dBm
HAFMA2-052	14.0 - 18.0 / 28.0 - 36.0 GHz	SMA F	WR-28 / UG-599/U	X2	+13 dBm	+18 dBm
HAFMA2-117	16.0 - 20.0 / 32.0 - 40.0 GHz	2.9 mm F	2.9 mm F	X2	+13 dBm	+13 dBm
HAFMA2K-324	16.0 - 20.0 / 32.0 - 40.0 GHz	2.9 mm F	2.9 mm F	X2	+10 dBm	+17 dBm
HAFMA4-212	8.5 - 9.0 / 34.0 - 36.0 GHz	SMA F	WR-28 / UG-599/U	X4	+4 dBm	+12 dBm
HAFMB4K-328	9.0 - 11.0 / 36.0 - 44.0 GHz	2.4 mm F	2.4 mm F	X4	+5 dBm	+16 dBm
HAFMQ4-339	10.0 - 12.0 / 40.0 - 48.0 (50) GHz	2.9 mm F	WR-22 / UG-599/U*	X4	+7 dBm	+10 dBm
HAFMU2-118	23.5 - 25.0 / 47.0 - 50.0 GHz	WR-28	WR-19 / UG-599/U-M*	X2	+13 dBm	+13 dBm
HAFMV4-208	12.5 - 12.75 / 50.0 - 51.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+10 dBm	+15 dBm
HAFMV2-A	25.0 - 28.0 / 50.0 - 56.0 GHz	2.9 mm F	WR-15 / UG-385/U	X2	+13 dBm	+13 dBm
HAFMV4-157	25.5 - 27.5 / 51.0 - 55.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+10 dBm	+15 dBm
HAFMV4-244	13.0 - 15.25 / 52.0 - 61.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+10 dBm	+13 dBm
HAFMV2-188	26.0 - 32.5 / 52.0 - 65.0 GHz	2.9 mm F	WR-15 / UG-385/U	X2	+13 dBm	+10 dBm
HAFMV4-187	13.0 - 17.0 / 52.0 - 68.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+5 dBm	+13 dBm
HAFMV4-136	14.25 - 16.5 / 55.0 - 65.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+7 dBm	+13 dBm
HAFMV4-321	14.25 - 16.5 / 57.0 - 66.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+7 dBm	+12 dBm
HAFMV4-223	14.25 - 16.5 / 57.0 - 66.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+10 dBm	+14 dBm
HAFMV4-294	14.375 - 15.125 / 57.5 - 60.5 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+10 dBm	+15 dBm
HAFMV4-204	14.5 - 15.5 / 58.0 - 62.0 GHz	2.9 mm F	WR-15 / UG-385/U	X4	+12 dBm	+14 dBm

## Passive Multipliers

Part Number	Input / Output Frequency	Input Connector	Output Connector	Input Power	Output Power
HMM3E-026	20.0 - 30.0 / 60.0 - 90.0 GHz	2.9 mm female	WR-12 UG-387/U	23 dBm	7 dBm
HMM3W-027	25.0 - 36.66 / 75.0 - 110.0 GHz	WR-28 UG-599/U	WR-10 UG-387/U-M	23 dBm	7 dBm
HMM3D-023	36.66 - 56.66 / 110.0 - 170.0 GHz	WR-19 UG-383/U	WR-6 UG-387/U-M	+5 to +13 dBm	-6 dBm
HMM2G-022	87.5 - 100.0 / 175.0 - 200.0 GHz	WR-10 UG-387/U-M	WR-5 UG-387/U-M	+20 to +23 dBm	+12 to +19 dBm
HMM3G-024	46.66 - 73.33 / 140.0 - 220.0 GHz	WR-15 UG-385/U	WR-5 UG-387/U-M	+5 to +13 dBm	-6 dBm
HMM3J-025	73.33 - 108.33 / 220.0 - 325.0 GHz	WR-10 UG-387/U-M	WR-3 UG-387/U-M	+5 to +13 dBm	-7 dBm

# Mixers

Renaissance customizes mixers—unbalanced, single or double balanced—tailored to precise gain and noise figure needs.

We employ top-grade diodes, ensuring premium performance for diverse applications. Quality meets customization with Renaissance.



Part number: HBM12X-X4-378

## Balanced Mixer, E-Band

Introducing the HBM12 Balanced Mixer: LO at 73 GHz, IF range of 2-12 GHz, RF output from 75-85 GHz, with an 8 dB conversion loss.

Featuring WR12 waveguide with UG-386/U interface, it ensures high-performance signal mixing for advanced applications.



# Converters

Renaissance specializes in high-reliability converters, including balanced, sideband modulators, single sideband, and subharmonic variants, tailored to meet diverse application needs.

With meticulous design and manufacturing, we ensure top performance and reliability for every specific requirement.



Part number: HBUC12LB-063

## Balanced Upconverter, E-Band

Introducing Renaissance's latest balanced converter: LO at 75.4 GHz, IF spanning 0.35-1.85 GHz, producing RF from 75.75-77.25 GHz.

Configured in WR-12, it promises precision and versatility for advanced applications, ensuring seamless integration and optimal performance.



## Mixers

			SSB Loss, Low IF		High IF
Part Number	Frequency	Waveguide	RF Bandwidth	Loss	Loss (Typical)
HBM28	26.5 - 40 GHz	WR - 28	3 GHz	6 dB	8 dB
HBM22	33 - 50 GHz	WR - 22	3 GHz	6 dB	9 dB
HBM19	40 - 60 GHz	WR - 19	2 GHz	6.5 dB	9.5 dB
HBM15	50 - 75 GHz	WR - 15	7 GHz	6.5 dB	9.5 dB
HBM12	60 - 90 GHz	WR - 12	5 GHz	7 dB	10 dB
HBM10	75 - 110 GHz	WR - 10	4 GHz	7 dB	10 dB

### General Specifications

LO to RF Isolation	20 dB typical	Input P1dB compression point	+3 dBm @ 60 GHz
VSWR (RF, LO, IF)	2.0:1 typical	PRF Maximum	0 dBm @94 GHz
LO Drive Level (PLO) unbiased	+13 dBm nominal	Diode Bias (option)	+6.0 VDC @ 30 mA
LO Drive Level, biased	+7 dBm nominal		

## Converters

			P <sub>LO</sub> @ +13 dBm	F <sub>IF</sub> @ 2 GHz	P <sub>IF</sub> @ +10 dBm
Part Number	Frequency	Waveguide	RF Output Power (Typical) *		
HBUC28	26.5 - 40 GHz	WR - 28	+4 dBm		
HBUC22	33 - 50 GHz	WR - 22	+4 dBm		
HBUC19	40 - 60 GHz	WR - 19	+1.5 dBm		
HBUC15	50 - 75 GHz	WR - 15	+1 dBm		
HBUC12	60 - 90 GHz	WR - 12	+1 dB		
HBUC10	75 - 110 GHz	WR - 10	0 dB		

### General Specifications

LO to RF Isolation	20dB (Typical)	Output P1dB compression point	+3 dBm (Typical) w/ +13 PLO
VSWR (RF, LO, IF)	2.0:1 (Typical)	PIF Maximum	+20 dBm CW, + 24 dBm pulsed
LO Drive Level (PLO) unbiased	+13 dBm nominal	Diode Bias (option)	+6.0 VDC @ 30 mA
LO Drive Level, biased	+10 nominal	Operating Temperature	-20°C to +60°C

# Low Noise Amplifiers

Renaissance Low Noise Amplifiers (LNAs) stand at the forefront of cutting-edge technology, engineered to excel across a broad spectrum from UHF to W-Band frequencies.

These LNAs boast an impressively low noise figure, ensuring optimal signal fidelity and sensitivity across the range. Designed with versatility in mind, they offer maximum bandwidth to accommodate diverse applications within defense and satellite communication (Satcom) sectors.

Whether coaxial, waveguide, surface mount, or drop-in configurations are required, Renaissance LNAs deliver. Their adaptability allows seamless integration into various systems, empowering engineers to tailor solutions precisely to their needs.

With a commitment to performance and reliability, Renaissance LNAs represent a pinnacle of engineering achievement, supporting critical missions where precision and dependability are paramount.



## 55-65 GHz, Low Noise Amplifier, V-Band

The HLNNAV-262 LNA, operating in the 55-65 GHz range, harnesses MMIC technology for superior reliability. Designed with WR-15 waveguide interfaces, it is perfect for communications, radar, and test equipment. This LNA excels in point-to-point radios, Wi-Gig systems, and radio transmitters, ensuring peak performance.

It features an integrated voltage regulator and bias sequencing circuitry, enabling operation with a single-bias power supply. The HLNNAV-262 seamlessly combines advanced technology and user-friendly design, making it an ideal choice for high-frequency applications.

Part number: HLNNAV-262

## Coaxial LNAs

Part Number	Frequency	Input/Output	Noise Figure (Typical)	Gain (Typical)	P <sub>1dB</sub> (Typical)
HLNAAK-076	24.0 - 31.0 GHz	2.9 mm, Female	3.2 dB	30 dB	8 dBm
HLNAAK-522	26.5 - 40.0 GHz	2.9 mm, Female	2.8 dB	35-43 dB	8 dBm
HLNAB2.4-435	43.0 - 45.0 GHz	2.4 mm, Female	3.5 dB	20 dB	5 dBm
HLNAVC-289	50.0 - 65.0 GHz	1.85 mm, Female	5.5 dB	33 dB	10 dBm
HLNAVC-290	50.0 - 65.0 GHz	1.85 mm, Female	5.5 dB	24 dB	10 dBm
HLNAVC-265	55.0 - 65.0 GHz	1.85 mm, Female	5.5 dB	16 dB	10 dBm
HLNAVC-465	57.0 - 66.0 GHz	1.85 mm, Female	5.5 dB	24 dB	10 dBm

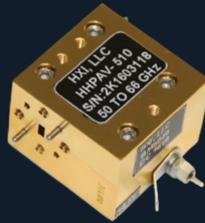
## Waveguide LNAs

Part Number	Frequency	Input/Output	Noise Figure (Typical)	Gain (Typical)	P <sub>1dB</sub> (Typical)
HLNAA-314	28.0 - 36.0 GHz	WR-28 / UG- 599/U	3.5 dB	19 dB	13 dBm
HLNAA-266	32.0 - 34.0 GHz	WR-28 / UG-599/U	3 dB	40 dB	20 dBm
HLNAA-372	33.0 - 36.0 GHz	WR-28 / UG-599/U	3.2 dB	35 dB	10 dBm
HLNAA-346	34.0 - 36.0 GHz	WR-28 / UG- 599/U	3.6 dB	25 dB	8 dBm
HLNAU-229	50.0 - 60.0 GHz	WR-19, UG-383/U-M	5.2 dB	34 dB	10 dBm
HLNAV-283	50.0 - 60.0 GHz	WR-15 / UG-385/U	5.2 dB	16 dB	10 dBm
HLNAV-364	50.0 - 65.0 GHz	WR-15 / UG-385/U	5.2 dB	25 dB	10 dBm
HLNAV-383	50.0 - 67.0 GHz	WR-15 / UG-385/U	5.2 dB	30 dB	10 dBm
HLNAV-262	55.0 - 65.0 GHz	WR-15 / UG- 385/U	4.8 dB	16 dB	10 dBm
HLNAV-357	57.0 - 64.0 GHz	WR-15 / UG-385/U	5 dB	34 dB	10 dBm
HLNAV-361	57.0 - 66.0 GHz	WR-15 / UG-385/U	5 dB	28 dB	10 dBm
HLNAE-285	70.0 - 80.0 GHz	WR-12 / UG-387/U	5.5 dB	22 dB	3 dBm
HLNAE-270	71.0 - 76.0 GHz	WR-12 / UG- 387/U	5.8 dB	28 dB	3 dBm
HLNAE-630	71.0 - 76.0 GHz	WR-12 / UG-387/U	5.5 dB	18 dB	6 dBm
HLNAE-496	75.0 - 85.0 GHz	WR-12 / UG-387/U	6.1 dB	20 dB	3 dBm
HLNAE-631	76.0 - 81.0 GHz	WR-12 / UG-387/U	4.5 dB	18 dB	6 dBm
HLNAW-624	76.0 - 81.0 GHz	WR-10 / UG-387/U-M	4.5 dB	18 dB	6 dBm
HLNAE-286	80.0 - 90.0 GHz	WR-12 / UG-387/U	5.5 dB	22 dB	3 dBm
HLNAE-632	81.0 - 86.0 GHz	WR-12 / UG-387/U	4.5 dB	17 dB	5 dBm
HLNAW-345	89.0 - 95.0 GHz	WR-10 / UG-387/U-M	5.5 dB	35 dB	15 dBm
HLNAW-241	90.0 - 98.0 GHz	WR-10 / UG-387/U-M	6 dB	32 dB	8 dBm
HLNAW-277	90.0 - 101.0 GHz	WR-10 / UG-387/U-M	5.5 dB	22 dB	2 dBm
HLNAW-379	92.0 - 96.0 GHz	WR-10 / UG-387/U-M	5.5 dB	16 dB	2 dBm

# Power Amplifiers

The HMPA and HHPA Series offer medium to high power amplifiers spanning 20-100 GHz with customizable gain and bandwidth. Utilizing MMIC technology ensures reliability. They feature built-in voltage regulators and bias sequencers, simplifying circuitry for users.

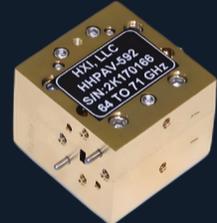
Custom designs are available without requiring NRE in most cases. Engineered to perform with the highest reliability, our amplifiers are widely used in Defense and Space applications where heat dissipation is an important issue.



Part number: HHPAV-510

## 50-66 GHz, Power Amplifier, V-Band

This WR15 amp is suitable for communication and radar transmitters and features integrated voltage regulation and bias sequencing.



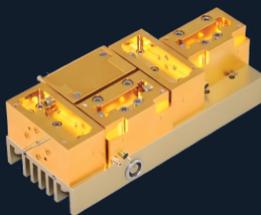
Part number: HHPAV-592

## 64-71 GHz, Power Amplifier, V-Band

This V-Band Amplifier MMIC technology for reliability. Best suited for radar and test systems.

These amplifiers serve in radar, communication systems, LO chains, and test equipment. They offer flexibility for combining low noise and power amplifier stages for enhanced performance.

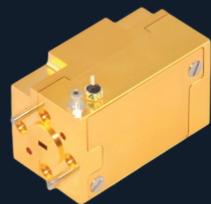
Additionally, they can be packaged with other functions for tailored setups. Understanding power budget and space constraints, Renaissance works hand-in-hand with the team to optimize mechanical and electrical characteristics to meet end-application requirements.



Part number: HHPAW-578

## 88-96 GHz, Power Amplifier, W-Band

A cutting-edge W-Band high power amplifier offers 1W output power across a wide band in a WR-10 waveguide assembly.



Part number: HHPAW-579

## 88-96 GHz, Power Amplifier, E-Band

HHPAW-579 excels as an E-Band power amplifier due to its high performance, reliability, and suitability for defense and telecommunication radio systems.

## Coaxial Power Amplifiers

Part Number	Frequency	Input/Output	Gain (Typical)	P <sub>1dB</sub> (Typical)
HMPAAK-133	17.0 - 31.0 GHz	2.9 mm, Female	30 dBm	20 dBm
HHPAKK-371	23-5 - 26.5 GHz	2.9 mm, Female	30 dBm	19 dBm
HHPAB2.4-511	40.0 - 47.5 GHz	2.4 mm, Female	15 dBm	23 dBm
HHPAVC-250	50.0 - 66.0 GHz	1.85 mm, Female	35 dBm	16 dBm

## Waveguide Power Amplifiers

Part Number	Frequency	Input/Output	Gain (Typical)	P <sub>1dB</sub> (Typical)
HHPAA-301	32.0 - 36.0 GHz	WR-28, UG-599/U	20 dBm	25 dBm
HHPAA-022	34.5 - 35.5 GHz	WR-28, UG-599/U	15 dBm	29 dBm
HHPAV-510	50.0 - 66.0 GHz	WR-15, UG-385/U	34 dBm	14 dBm
HHPAV-261	53.0 - 60.0 GHz	WR-15, UG- 385/U	15 dBm	14 dBm
HHPAV-297	55.0 - 65.0 GHz	WR-15, UG- 385/U	30 dBm	13 dBm
HHPAV-222	55.0 - 65.0 GHz	WR-15, UG- 385/U	25 dBm	14 dBm
HHPAV-355	55.0 - 65.0 GHz	WR-15, UG- 385/U	28 dBm	17 dBm
HHPAV-461	57.0 - 63.0 GHz	WR-15, UG-385/U	17 dBm	17 dBm
HHPAV-302	57.0 - 66.0 GHz	WR-15, UG-385/U	16 dBm	14 dBm
HHPAV-330	57.0 - 66.0 GHz	WR-15, UG- 385/U	25 dBm	14 dBm
HHPAV-295	57.0 - 66.0 GHz	WR-15, UG- 385/U	29 dBm	15 dBm
HHPAV-548	57.0 - 66.0 GHz	WR-15, UG- 385/U	32 dBm	21 dBm
HHPAV-254	57.5 - 66.0 GHz	WR-15, UG- 385/U	25 dBm	16 dBm
HHPAV-285	58.0 - 62.0 GHz	WR-15, UG-385/U	15 dBm	17 dBm
HHPAE-496	71.0 - 76.0 GHz	WR-12, UG-387/U	23 dBm	35 dBm
HMPAE-529	76.0 - 77.0 GHz	WR-12, UG-387/U	21 dBm	34 dBm
HHPAW-188	76.0 - 77.0 GHz	WR-10, UG-387/U-M	15 dBm	30 dBm
HHPAE-517	76.0 - 81.0 GHz	WR-12, UG-387/U	20 dBm	30 dBm
HMPAE-543	76.0 - 84.0 GHz	WR-12, UG-387/U	14 dBm	32 dBm
HHPAE-497	81.0 - 86.0 GHz	WR-12, UG-387/U	21 dBm	28 dBm
HHPAW-336	85.0 - 91.0 GHz	WR-10, UG-387/U-M	+20 (PSAT) dBm	30 dBm
HMPAW-085	86.0 - 88.0 GHz	WR-10, UG-387/U-M	13 dBm	13 dBm
HMPAW-077	90.0 - 98.0 GHz	WR-10, UG-387/U-M	10 dBm	18 dBm
HMPAW-098	92.0 - 96.0 GHz	WR-10, UG-387/U-M	10 dBm	18 dBm
HHPAW-348	92.0 - 96.0 GHz	WR-10, UG-387/U-M	+15 (PSAT) dBm	18 dBm
HHPAW-530	92.0 - 96.0 GHz	WR-10, UG-387/U-M	15 dBm	30 dBm



# Combiners, Dividers, and Couplers

## Beamformer, L-Band

The 10A3NB-8S is a robust high-power beamformer, distributing power from 6-18 dB across its 8 output ports.

The power division is symmetrical and supports amplitude and phase combining of frequencies to steer a beam in the preferred direction.

Operating within 1100-1500 MHz, its compact 8"x5" footprint belies its capability. With a peak handling capacity of 350W and a continuous wave rating of 35W, it's a reliable choice for demanding applications.



Part number: 10A3NB-8S



Part number: 9A2NAJ

## 470-860 MHz, 2:1 Combiner, UHF-Band

Renaissance introduces a high-power UHF-Band 2:1 combiner for communication, instrumentation, and military devices. Operating at 470-860 MHz, it boasts low amplitude/phase balance and 330W per channel input, ensuring reliable performance across diverse applications.



Part number: 10A4NA-90

## 2.2-2.4 GHz, 90 Degree Hybrid Coupler, S-Band

Renaissance's innovative design for airborne communication links includes a compact 3 dB, 90-degree Hybrid Coupler. It boasts low insertion loss and high isolation, making it an efficient and reliable solution for medium power applications in aerospace communication systems.



Part number: 10A2BAF-2S

## 2-Way Power Divider, Space Qualified

For space applications, Renaissance has designed a 220-450 MHz splitter with 0.2 dB loss that can handle 50W average in a compact 3.000" x 2.350" x 0.394".

The product is manufactured in a 100K clean room and screened per MIL-PRF-38534 Table C-111.

Part Number	Configuration	Frequency	Loss	Isolation	Power (Avg)	Temperature	Size (inches)
10A2BAG-2S	2-way	0.001 - 0.03 GHz	0.2 dB	25 dB	10 W	-25° - +70°	1.97 x 1.02 x 0.95
10A1NA-2B	2-Way	0.108 - 0.118 GHz	0.5 dB	18 dB	10 W	-10° - +60°	2.56 x 2.56 x 1.77
10A2BAF-2S	2-Way	0.22 - 0.4 GHz	0.4 dB	20 dB	50 W	-45° - +85°	2.5 x 3.00 x 0.40
10A2BC-6S	6-way	0.8 - 2 GHz	0.6 dB	20 dB	5 W	-40° - +75°	3.5 x 3.6 x 0.40
10A2BE	4 x 4	0.8 - 2.2 GHz	1.0 dB	20 dB	2 W	-40° - +75°	2.58 x 2.58 x 0.62
10A2BG-2N	2-Way	1 - 2 GHz	0.25 dB	15 dB	600 W	-55° - +75°	3.50 x 4.0 x 1.16
10A2BY-16S	16-Way	0.4 - 0.96 GHz	1.0 dB	23 dB	1 W	-40° - +85°	5.00 x 9.00 x 0.4
10A2BZ-3S1	3-Way	0.395 - 0.495 GHz	0.5 dB	20 dB	20 W	-40° - +85°	4.50 x 3.00 x 0.94
10A2BZ-4S1	4-Way	0.395 - 0.495 GHz	0.5 dB	20 dB	40 W	-40° - +85°	4.50 x 3.00 x 0.94
10A2NA-8N	8-Way	0.42 - 0.45 GHz	0.45 dB	20 dB	20 W	-40° - +85°	8.45 x 6.05 x 0.69
10A2NA-3N	3-Way	0.79 - 0.96 GHz	0.5 dB	20 dB	100 W	-30° - +60°	4.60 x 4.00 x 1.10
10A2NA-4SM	4-Way	0.4 - 0.48 GHz	0.5 dB	20 dB	5 W	0° - +40°	6.00 x 4.75 x 0.81
10A2NA-9S	9 Way	0.8 - 0.87 GHz	0.8 dB	20 dB	10 W	-30° - +60°	9.00 X 6.00 X .75
10A2NAD-2N	2-WAY	0.8 - 0.87 GHz	0.4 dB	20 dB	10 W	-40° - +85°	2.0 X 2.0 X 1.0
10A2NAE-2N	2 Way	0.824 - 0.896 GHz	0.8 dB	20 dB	55 W	-30° - +70°	5.0 X 5.0 X 3.37
10A2NAF-2N	2 Way	0.851 - 0.94 GHz	0.8 dB	25 dB	55 W	-30° - +50°	8.00 X 4.00 X 1.75
10A2NB-16S	16 Way	0.89 - 0.96 GHz	0.6 dB	20 dB	10 W	-40° - +85°	8.5 X 3.0 X .38
10A2NB-2S	2 Way	0.89 - 0.96 GHz	0.25 dB	20 dB	10 W	-40° - +85°	2.0 X 1.5 X .38
10A2NB-3S	3 Way	0.89 - 0.96 GHz	0.3 dB	20 dB	10 W	-40° - +85°	2.75 X 2.0 X .38
10A2NB-4S	4 Way	0.89 - 0.96 GHz	0.3 dB	20 dB	10 W	-40° - +85°	2.5 X 2.0 X .38
10A2NB-6S	6 Way	0.89 - 0.96 GHz	0.4 dB	20 dB	10 W	-40° - +85°	3.5 X 3.6 X .40
10A2NB-8S	8 Way	0.89 - 0.96 GHz	0.5 dB	20 dB	10 W	-40° - +85°	4.5 X 2.75 X .38
10A2NJ-4S	4-Way	1 - 2 GHz	0.7 dB	22 dB	20 W	-40° - +85°	2.53 X 1.70 X .394
10A3BA-2S	2 Way	1 - 3 GHz	0.7 dB	18 dB	10 W	-30° - +85°	4.0 X 1.5 X .38
10A3BAM-12S	12 Way	0.8 - 2.5 GHz	12.5 dB	18 dB	50 W	-35° - +85°	10.197 X 3.937 X .750
10A3BAN-16S	16Way	0.9 - 2.5 GHz	1.2 dB	18 dB	1 W	-35° - +85°	9.00 X 5.00 X .4
10A3BK-16S	16Way	0.75 - 2.25 GHz	1.0 dB	20 dB	10 W	-35° - +85°	8.5 X 4.0 X .38
10A4BAA-2S	(4) 2Way	0.4 - 2.75 GHz	0.6 dB	20 dB	3 W	-35° - +85°	5.94 X 3.70 X .5
10A4BV-RoHS	Switch Combiner 4 port	0.38 - 3.85 GHz	4.0 dB	113 dB	1 W	-35° - +85°	4.0 x 4.0 x 1.13
10A4NAG-2N	2 Way	1.93 - 1.99 GHz	0.8 dB	24 dB	70 W	-30° - +50°	8.00 X 5.70 X 1.67
10A5BAJ-8S	8 Way	2 - 4 GHz	1.0 dB	20 dB	10 W	-35° - +85°	4.567 X 2.283 X .472
10A7NA-12S	12 Way	4.9 - 5.2 GHz	12.3 dB	18 dB	20 W	0° - +50°	17.72 X 4.00 X .62
10A8BA-16S	16 Way	9 - 10 GHz	13 dB	18 dB	100 W	0° - +50°	8.75 X 3.3 X .5
10A9NF-4S	4 Way	15 - 18 GHz	7.5 dB	18 dB	30 W	-40° - +85°	2.45 X .95 X .3

# Electromechanical Switches

Renaissance offers high-reliability switches spanning from SPDT to SP18T, transferring DC to 40 GHz with 10 million cycles. Compatible with SMA, N, TNC, and SC connectors, they handle high power with low IMD.

Operable at 12, 15, 18, 24, and 28V, these switches come in various configurations, including latching, failsafe, TTL, indicator, and terminated, catering to diverse application needs.

For space applications, we offer designs that are hermetically sealed and can withstand stringent shock and vibration specifications. Solutions for applications requiring handling of high peak and power levels are available in standard and custom configurations.



Part number: SW-316

## 2.0-2.3 GHz, Hermetic Switch

Renaissance presents a space qualified hermetic switch tailored for 2.0-2.3 GHz. Designed to endure space's harsh conditions, it offers 1M cycles minimum life, 0.25 dB insertion loss, and 60 dB isolation.

With stable operating voltage, it withstands wide temperature ranges (-38°C to 78°C) and harsh environments, ensuring reliable performance in demanding applications.



Part number: HSWM22801-309

## 26-40 GHz, High Power Switch, Ka-Band

Introducing a cost-effective MMIC solution, this device offers swift 30ns switching time, high isolation, and low loss, coupled with robust 10W power handling under TTL control.

Operating within the 26-40 GHz range, it ensures efficient signal management with 30 dB typical isolation and a maximum of 1.8 dB loss. Powered by +5v @ 35mA and -25V @ 1mA (typ), it uses 2.9mm female RF connectors, solder feedthroughs for BIAS, and SMA female for logic, catering to diverse RF applications with reliability and precision.

## Electromechanical Switches

Part Number	Configuration	Frequency	Loss	Isolation	Operating current	Size (inches)
RSM-2D-12-B	SPDT	DC/18 GHz	0.2/0.5 dB	75/60 dB	175 mA	1.25 X 1.80X 0.52
RSM(B)-2D-L-TTL-I-28	SPDT with TTL & Indicator	DC/18 GHz	0.5 dB	60 dB	175 mA	1.5 X 1.61X 0.5
RSM-3D-L-TTL-12-B	SP3T with TTL	DC/18 GHz	0.2/0.5 dB	90/60 dB	175 mA	2.00 X 2.20 X 2.10
RSM-4D-L-TTL-I-D-24-B	Coaxial RF	DC/12.4 GHz	0.2/0.4 dB	90/70 dB	175 mA	2.60 X 2.01 X 2.00
RSM-5D-TTL-12-B	Multiport	DC/18 GHz	0.2/0.5 dB	90/60 dB	175 mA	2.60 X 2.01 X 2.00
RSM-6D-24-M1B	Coaxial RF	DC/18 GHz	0.2/0.5 dB	75/60 dB	175 mA	1.70 X 1.50 X 1.75
RSM-6D-TTL-T-28-B	Coaxial RF	DC/18 GHz	0.2/0.5 dB	75/60 dB	175 mA	2.20 X 2.00 X 2.01
RSM-8D-TTL-L-I-D-28-B	SP8T	DC/18 GHz	0.2/0.5 dB	70/60 dB	840 mA	3.12 X 2.48 X 2.50
RSN-2D-12	SPDT	DC/6 GHz	0.25/0.4 dB	80/60 dB	175 mA	2.15 X 2.63 X 1.00
RSN-5D-TTL-L-I-D-28-B	Coaxial RF	DC/6 GHz	0.25/0.4 dB	80/60 dB	350 mA	2.70 X 2.01 X 2.60
RSSC-5D-TTL-L-I-D-28-B	SP5T (1800w)	DC/1 GHz	0.25 dB	70 dB	630 mA	3.08 X 2.40 X 3.70
RSTM-D-15-B	Transfer	DC/18 GHz	0.2/0.5 dB	75/60 dB	180 mA	1.35 X 2.00 X 2.18
RSTM-D-TTL-28-B	Transfer	DC/18 GHz	0.2/0.5 dB	75/60 dB	240 mA	1.35 X 2.00 X 2.18
SW187	Transfer	Dc/8 GHz	0.25/0.4 dB	80/60 dB	240 mA	2.15 x 2.63 x 1.00
SW307	SPDT	.4/.5 GHz	0.2 dB	75 dB	175 mA	2.75 X 2.20 X 1.25
SW312	MULTIPOINT	DC/18 GHz	0.2/0.5 dB	75/60 dB	175 mA	1.90 X 1.50 X 1.75
13A4NA-2S	SPDT (Diode Switch)	2.0/2.3 GHz	1.0 dB	33 dB	-	1.00 X 1.00 X 0.25

- Switching time: 20 mS
- Operating Temperature: -40 to +85C
- Available in 12/15/24/28 VDC

## Solid State Switches

Part Number	Configuration	Frequency	Loss	Isolation	Operating current	Size (inches)
17A2BAN	SPST	.0005/.5 GHz	5/7 dB	60/90 dB	20 mA	1.953 x .950 x 3.00
17A6BB-8S	8 WAY MIMIC	.4/6 GHz	2.5/5.5 dB	30/35 dB	5 mA	1.90 X 6.00 X 0.5
HSWM22801/2.9-309	SPDT	26.5 -40 GHz	1.3 dB	35 dB	35 mA	1.78 x 1.20 x 1.00

- Switching time: 20 mS
- Operating Temperature: -40 to +85C
- Available in 5 VDC



# Switch Matrices

## 10-1200 MHz, Solid State Switch Matrix

Introducing a versatile RF matrix switch with a frequency range of 10-1200 MHz. Featuring 8 inputs, 12 outputs, and solid-state GaAs technology, it ensures non-blocking, full fan-out configuration.

With <math><1.3:1</math> VSWR, high isolation (>60 dB), and rapid 10 ms switching speed, it offers precise signal control. Equipped with BNC connectors, a local keypad, and remote interfaces, it's adaptable to various setups.

Operating at



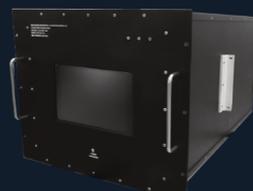
Part number: 18A2BA



Part number: 18A6BAC

### 4x48, Switch Matrix Blocking, DC to 6 GHz

Renaissance introduces the 18A6BAC: a 4x48 switch matrix covering 700 MHz to 6 GHz, featuring solid-state switches (>1 billion cycles) with rapid 100 ns switching. Perfect for diverse testing needs, from portable devices to high-tech electronics, it extends ATE equipment for simultaneous product testing.



Part number: 18A6BAY

### 24x12, Switch Matrix Non-Blocking, DC to 6 GHz

For 5G ATE applications, Renaissance offers a 400-6000 MHz operating bandwidth switch supporting frequencies below MMW. Features include an LCD touch screen, Ethernet remote control, MMIL-based solid-state switches for rapid switching, and scalability for customizable I/Os.



Part number: 18A7BBK

### DC to 18 GHz, High Power, 8x8 Switch Matrix

Renaissance unveils a revolutionary switch matrix balancing high-power signals at lower frequencies while maintaining isolation for weaker signals at higher frequencies. With up to 100W power at 6 GHz and 120 dB isolation, it simplifies radar transceiver testing, eliminating extra switching modules.

Part Number	Configuration	Frequency	Loss	Isolation	VSWR	Size (inches)
18A1NAJ	3x4 Switch Matrix	0.02 - 0.1 GHz	2.5 dB	60 dB	1.4	16.5 x 21 x 1.75
18A2NAB	3x4 Switch Matrix	0.1 - 1 GHz	2.5 dB	60 dB	1.4	16.5 x 21 x 1.75
18A4NAA	Rf Head-End Switch Matrix	2.4 - 2.485 GHz	2 dB	90 dB	1.8	19 X 21 X 3.47
18A4NAC	12x12 Switch Matrix	0.03 - 2.5 GHz	3 dB	70 dB	1.6	30 X 19 X 14
18A4NAD	6x6 Solid State Matrix	0.03 - 2.5 GHz	ATT. 91dB/1dB steps	75 dB	1.5	30 X 19 X 12.25
18A4NAJ	3x4 Switch Matrix	0.9 - 3 GHz	2.5 dB	60 dB	1.4	16.5 x 21 x 1.75
18A5NAA	3x4 Switch Matrix	3 - 6 GHz	2.5 dB	60 dB	1.4	16.5 x 21 x 1.75
18A6BAB	4x48 Dual Solid State Matrix	0.7 - 6 GHz	5 dB	35 dB	1.67	30 X 19 X 12.25
18A6BAF	8x96 Solid State Matrix	0.6 - 6 GHz	5 dB	80 dB	1.40	30 X 19 X 25.64
18A6BAQ	8x8 Solid State Matrix	0.6 - 6 GHz	3 dB	80 dB	1.40	19 X 17.08 X .697
18A6BAR	12x96 Solid State Matrix	0.6 - 6 GHz	3.5 dB	80 dB	1.40	19 X 36 X 29.72
18A6BAV-2	16x16 Non-Blocking Switch Matrix	1 - 6 GHz	3.5 dB	80 dB	1.5	19 x 14 x 22
18A6BAW-1	16x8 Solid State Matrix	0.6 - 6 GHz	2.5 dB	25 dB	1.4	19.00 X 20.85 X 8.66
18A6BAX	28x2 Switch Matrix	0.776 - 5.925 GHz	3 dB	45 dB	1.45	19 X 23 X 16
18A6BAY	24x12 Non-Blocking Matrix	0.4 - 6 GHz	3 dB	50 dB	1.30	19 X 30 X 15.5
18A6BBE	38x2 Switch Matrix	0.0001 - 1.7 GHz	1 dB	55 dB	1.5	17 X 10 X 24
18A6BBH	24x4 Switch Matrix	0.4 - 6 GHz	2.5 dB	60 dB	1.5	19 X 24 X 8.5
18A7BBK	8x8 Switch Matrix	0.5 - 18 GHz	3.5 dB	65 dB	1.5	18.84 X 22.88 X 8.72
18A7NA	Rf Head-End Switch Matrix	2 - 6 GHz	3 dB	90 dB	1.32	19 X 21 X 3.47
18A7NAC	Rf Switching Unit	0.7 - 18 GHz	5 dB	90 dB	1.8	22 X 19 X 12.25
18A7NAG	Dac / Adc Switch Matrix	DC - 0.1 GHz	0.1 dB	90 dB	1.25	19 X 15.25 X 3.5
18A7NAJ	3x4 Switch Matrix	DC - 6 GHz	2.5 dB	75 dB	1.3	19 X 21 X 1.75
18A7NB	Switch Matrix	DC - 18 GHz	5 dB	55 dB	1.5	9 X 11 X 3.5
18A8BD	6x12 Switch Matrix Blocking	0.02 - 8 GHz	4 dB	20 dB	1.8	20 X 19 X 8.63

• Operating Temperature: -25°C to +65°C

# High Reliability Filters

Renaissance High Reliability RF Filters stand out for their robust design, crafted to excel in the demanding environments of defense, space, and telecommunication networks.

Leveraging premium materials and advanced manufacturing techniques, these filters ensure exceptional durability and performance consistency.

They are customizable to meet specific requirements, undergo thorough testing to validate reliability, and comply with industry standards such as MIL-STD-810 and MIL-PRF-55342.

With a proven track record in critical applications, Renaissance filters offer unmatched reliability and precision, making them the ideal choice for mission-critical systems.

Designed to meet the end application, Renaissance can configure filters in Cavity, Combined, Printed or Lumped Element formats. Custom designs are available.



Part number: 16A3BJ

## Duplexer and 3 Way Divider, S-Band

Renaissance's PCS band duplexer with integrated divider for iDAS systems boasts low insertion loss and high isolation between output ports.



Part number: 16A4ND

## GSM-PCS Diplexer

A high power diplexer that provides 60 dB rejection between 862-894 and 1734-1784 MHz and can handle 85W of CW power.

Part Number	Configuration	Center Frequency	3dB Bandwidth	Loss	Rejection	Power (Avg)
16A8NA-1	Filter	8.750 GHz	0.3 GHz	1.1dB typ	70dB typ	300 W
16A8NA-2	Filter	9.050 GHz	0.3 GHz	1.1dB typ	70dB typ	300 W
16A8NA-3	Filter	9.350 GHz	0.3 GHz	1.1dB typ	70dB typ	300 W
16A8NA-4	Filter	9.050 GHz	0.3 GHz	1.1dB typ	70dB typ	300 W
16A2NAB	Diplexer	0.698/0.716 GHz	0.728 - 0.746 GHz	1.0/1.30 dB	50 - 60 dB	30 W
16A3BJ	Diplexer	1.700/1.900 GHz	2.1 - 2.3 GHz	0.25/1.85 dB	50 - 60 dB	50 W
16A4NAJ	Diplexer	1.710/1.770 GHz	2.11 - 2.17 GHz	1.0/1.30 dB	50 - 60 dB	30 W
16A4ND	Diplexer	0.862/0.894 GHz	1.734 - 1.784 GHz	0.5/1.30 dB	50 - 60 dB	60 W
16A6BA	Diplexer	DC/2.500 GHz	3.3 - 6 GHz	1.5/1.67 dB	50 - 60 dB	30 W
16A9BA	Diplexer	11.202 GHz (+/-10 MHz)	13.247 GHz (+/-10 MHz)	2.0/1.8 dB	50 - 60 dB	80 W

# GPIB Connectivity

Renaissance's fully in-house designed GPIB plotter emulator is the solution for your legacy equipment printing needs. Tired of shuffling old printers and plotters around the lab? Our plotter emulator turns your legacy equipment into a full featured, connected device - plot directly to any modern printer with zero delays and no additional networking equipment required!

## HPGL Plotter Emulator

- Full featured HPGL-over-GPIB plotter/printer emulator.
- Output plots as IPP print jobs, emails, or directly save over network.
- Onboard DHCP server for plug-and-play compatibility.
- Onboard hotspot mode - Tweak plot settings right from your cell phone.
- Customize plot output, including colors, pen sizes, output modes, connectivity options and more. Part number: 15PRNADP-1
- Built in display - see status, including IP addresses and errors, right from the device.
- OTA updates. Have a problem? Our technicians will help diagnose and correct the issue, and we can push an update directly to your device to get you back up and running.



Want to print to your existing shared printer? Not a problem - simply connect our plotter emulator to your WiFi, and enjoy the same ease of printing as everyone else. In fact, you don't even need a physical printer at all - send your plots as emails, or save directly to a network share.



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