Space Components & Assemblies

Design, Development & Manufacturing

Features

- State-of-the-art performance
- Custom & catalog die, chip-in-package and assemblies
- Proven reliability data, MTTF and/or FITs
- 100% electrical testing up to 110 GHz
- 100% space visual inspection per MIL-STD-883 Method 2010, Condition A
- Space qualification per MIL-PRF-38534 and MIL-PRF-38535 (as applicable)
- Comprehensive in-house SEM, XRF, C-SAM & real-time X-Ray and environmental test facilities
- Individually packaged products, multi-chip modules & custom assemblies
- Fully compliant products provide an optimized form, fit & function solution

Hittite Microwave Products from Analog Devices has an extensive 20 year history of supplying High Reliability MMIC components for a wide range of space programs supporting satellite and planetary missions. We have the knowledge, expertise and resources to explore the far reaches of RF and mixed signal device technologies in GaAs, Silicon, SiGe and InP. Our unique blend of technologies, world-class products and leading-edge capabilities allows customers to support the most challenging space applications with a complete portfolio of options; from individual component level devices to fully integrated solutions. We support MIL-STD-883 and performs 100% electrical and environmental testing, burn-in, 1000-hour plus life tests and wafer-level lot acceptance testing for space qualification. Most of our products are available for space application and qualification.

Hittite
MICROWAVE PRODUCTS
FROM ANALOG DEVICES

SPACE LEVEL

HERITAGE

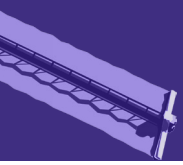
We have custom up-screened many devices for space applications to MIL-PRF-38534 Class K, MIL-PRF-38535 Class S, NASA EEE-INST-002, and customer specific requirements.

Parts have been provided as die & chip-in-a-package through complex hybrid designs. Below is an extensive list of generic parts that we have provided to our customers for space flight.

TECHNOLOGY	GaAs HBT	GaAs MESFET	GaAs PHEMT
PRODUCTS	**AMPLIFIERS** HMC313, HMC395, HMC397, HMC431 **FREQUENCY DIVIDERS** HMC361, HMC363, HMC365, HMC437, HMC438, HMC439 **FREQUENCY DETECTORS** HMC440 **FREQUENCY MULTIPLIERS** HMC443 **PLOs** HMC698 **VCOs** HMC358, HMC384, HMC386, HMC391, HMC416, HMC430, HMC431, HMC508, HMC510, HMC511, HMC512, HMC530, HMC531, HMC586	**AMPLIFIERS** HMC392 **ATTENUATORS (Digital)** HMC290, HMC306, HMC335, HMC424, HMC425, HMC470, HMC473 **ATTENUATORS (VVA)** HMC346, HMC712 **FREQUENCY MULTIPLIERS** HMC205 **MIXERS** HMC128, HMC129, HMC130, HMC141, HMC142, HMC143, HMC207, HMC213A, HMC220, HMC258, HMC260, HMC292, HMC329, HMC422, HMC423, HMC553, HMC557, HMC773, HMC774, HMC1015 **MODULATORS** HMC135 **SWITCHES** HMC183, HMC231, HMC232, HMC244, HMC252, HMC276, HMC322, HMC344, HMC347, HMC427, HMC607	**AMPLIFIERS** HMC263, HMC441, HMC442, HMC451, HMC462, HMC463, HMC465, HMC498, HMC499, HMC516, HMC517, HMC519, HMC566, HMC605, HMC616, HMC715, HMC870, HMC871, HMC903, HMC-ALH216, HMC-ALH376, HMC-ALH444 **ATTENUATORS** HMC941 **FREQUENCY MULTIPLIERS** HMC448 **MIXERS** HMC264 **PHASE SHIFTERS** HMC936 **SWITCHES** HMC849

TECHNOLOGY	SiGe HBT	SiGe BiCMOS
PRODUCTS	**AMPLIFIERS** HMC471, HMC476, HMC479, HMC482 **FREQUENCY DIVIDERS** HMC862 **MODULATORS** HMC495	**COMPARATORS** HMC675 **FANOUT BUFFERS** HMC987 **PLL** HMC703

For more information, contact us: RFMG-space@hittite.com



SPACE CLASS K / CLASS S PARTS

AMPLIFIERS

Frequency Range (GHz)	Product Description	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Package	ECCN Code	Part Number
DC - 4	HBT Gain Block	15	+28	4.5	+15	G8	EAR99	Ref: HMC395*
DC - 6	HBT Gain Block	17	+27	6.5	+14	G8	EAR99	Ref: HMC313*
2 - 20	Wideband LNA w/AGC	14	+28	2.5	+16	Chip	EAR99	HMC8803
21 - 32	Medium PA	16	+33	5	+24	Chip	3A001.b.2.d	Ref: HMC499*

ATTENUATORS

Frequency Range (GHz)	Product Description	Insertion Loss (dB)	Attenuation Range (dB)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
DC - 3	6-Bit Digital	3	0.5 - 31.5	+32	0 / -5v	G16	EAR99	Ref: HMC424*
DC - 6	6-Bit Digital	1.8	0.25 - 15.75	+55	TTL / CMOS	Chip	EAR99	Ref: HMC792*
DC - 8	Analog VVA	2	0 - 30	+10	0 to -3v	G8	EAR99	Ref: HMC346*
DC - 13	6-Bit Digital	4	0.5 - 31.5	+32	0 / -5V	Die	EAR99	HMC8802
DC - 13	6-Bit Digital	4	0.5 - 31.5	+32	0 / -5v	Chip	EAR99	Ref: HMC424*
DC - 20	Analog VVA	2.2	0 - 25	+10	0 to -3V	Die	EAR99	HMC8801

MIXERS

RF Frequency (GHz)	Product Description	IF Frequency (GHz)	Conversion Gain (dB)	LO/RF Isolation (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
0.7 - 2	+10 LO, DBL-BAL	DC - 0.3	-9	45	+17	G8	EAR99	Ref: HMC207*
1.8 - 5	+15 LO, DBL-BAL	DC - 2	-10	40	+18	G8	EAR99	Ref: HMC128*
2 - 18	DBL-BAL	DC - 4	-10	35	+19	Chip	EAR99	Ref: HMC1048*
6 - 18	+15 dBm LO, DBL-BAL	DC - 6	-10	25	+21	Die	EAR99	HMC8804
25 - 40	+13 LO, DBL-BAL	DC - 8	-9.5	42	+19	Chip	EAR99	Ref: HMC329*
26 - 32	+13 dBm LO, TPL-BAL	16 - 22	-10	45	+22	Die	EAR99	HMC8805

FREQUENCY MULTIPLIERS

RF Frequency (GHz)	Product Description	Output Freq. (GHz)	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Package	ECCN Code	Part Number
4.0 - 10.5	x2 Active	8 - 21	+5	+17	-139	Chip	EAR99	Ref: HMC561*

PHASE SHIFTERS

RF Frequency (GHz)	Product Description	Insertion Loss (dB)	Phase Range (deg)	2nd Harmonic Pin = -10 dBm (dBc)	Control Voltage Range (Vdc)	Package	ECCN Code	Part Number
1.2 - 1.4	6-Bit Digital	4	5.625 - 360	45	0 / +5v	G24	EAR99	Ref: HMC936*

SWITCHES

Frequency Range (GHz)	Product Description	Insertion Loss (dB)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
DC - 4	SP4T	2	40	+21	0 / -5v	G16	EAR99	Ref: HMC344*
DC - 4	SP4T	0.7	40	+25	TTL / CMOS	G16	EAR99	Ref: HMC244*
DC - 6	SPDT, High Isolation	1.4	43	+26	0 / -5v	G8	EAR99	Ref: HMC232*
DC - 6	SPST, High Isolation	1.4	52	+27	0 / -5v	G7	EAR99	Ref: HMC231*
DC - 12	SP4T	1.8	42	+27	0 / -5v	LH5	EAR99	Ref: HMC344*
DC - 15	SPDT, High Isolation	1.4	50	+26	0 / -5	Die	EAR99	HMC8800
DC - 20	SPDT, High Isolation	1.7	45	+23	0 / -5v	Chip	EAR99	Ref: HMC347*

*Ref: HMCXXX is provided for electrical performance and guidance only, contact factory for the space version. Available while supplies last.

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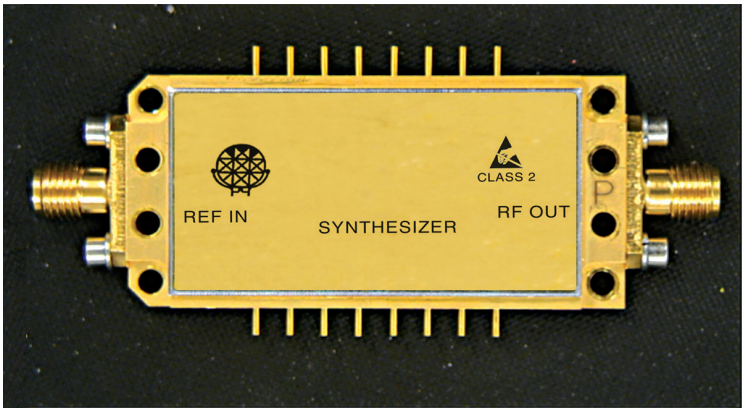
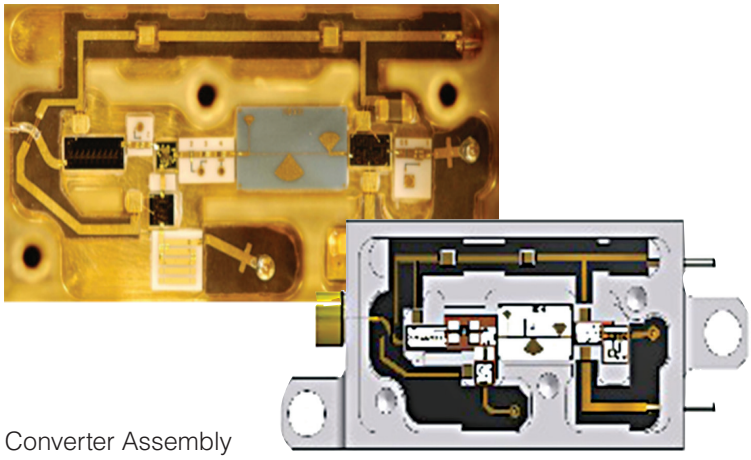
SPACE ASSEMBLIES



Space Qualified Microsynth®.



Converter Assembly

Our family of space qualified synthesizers is based upon the successful HMC-C070 Microsynth®. This module uses a number of our frequency generation devices including the HMC700 series integer/fractional PLLs. The module can be designed to accommodate different frequency ranges and digital control protocols.

Hittite Microwave Products, from Analog Devices, can meet stringent size, weight and performance requirements of any synthesizer over any frequency range up to Ku-Band.

State-of-the-art ultra-miniature up- or down-converter modules can be designed with our extensive line of mixers, frequency multipliers and amplifiers. Suitable filters are integrated to achieve the overall frequency response and spurious rejection. These assemblies can be provided from S-Band to Ka-Band depending on the customer requirement.

For more information, contact us: RFMG-space@hittite.com

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