

HIGH PERFORMANCE BROADBAND MIXERS

 **apitech**



APITech hybrid mixer product line covers
frequency ranges from 0.5 MHz to 26.5 GHz



Available in many industry standard surface mount, drop-in and connectorized housings, these mixers are ideal for high reliability applications. APITech mixers are offered in both double or triple balanced configurations for broad frequency coverage. Additionally, other diode-based versions include frequency doublers to 20 GHz, Image Reject and I/Q Modulators to 16 GHz.

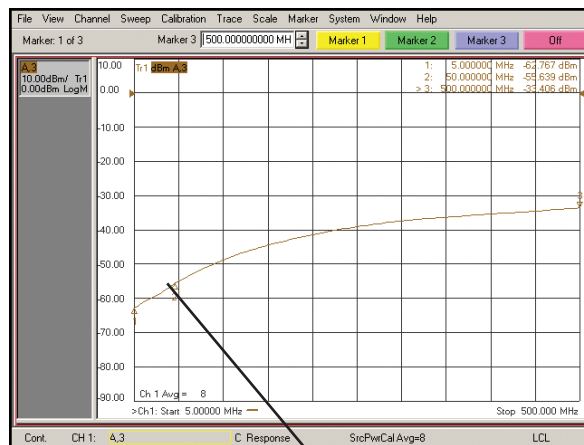
Integral to finding solutions to frequency conversion applications is the ability to not only test for compliance, but to recommend the optimum solution. We conduct a range of environmental tests to help us identify potential problems and recommend appropriate solutions. Our environmental chambers and diverse array of test equipment allow us to conduct these tests in-house providing for a faster turnaround of your complete design solution.

APITech applies the principles of its own Quality Management System to deliver the world class quality and consistency our military and commercial customers demand. The efficiencies gained from our manufacturing procedures enable us to cost effectively produce small quantities of custom mixers, along with high volume runs of our standard mixer lines. We carefully monitor critical phases of the production process with data logging technology and utilize our in-house testing capabilities from design through full production. The end result is a quality system worthy of our ISO9001:2000 certification.

Double Balanced Designs

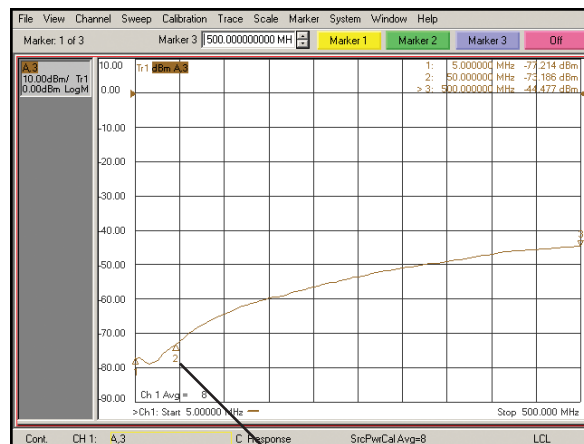
APITech's Double Balanced Mixers employ a single quad diode ring with two broadband baluns, one for the modulating signal (applied to the RF or IF port) and one for the carrier signal (applied to the LO port).

Excellent LO to IF Isolation through the use of matched diode selection.



55 dB Isolation (LO-to-IF)

Superior LO to RF Isolation through strict line length symmetry.



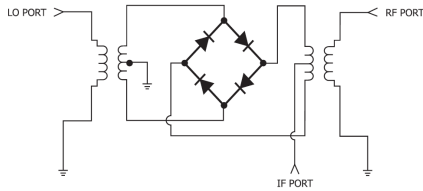
73 dB Isolation (LO-to-RF)

- Double Balanced Mixers feature a DC coupled output port (either RF or IF) for mixing applications requiring baseband frequency coverage, phase detection, or bi-phase modulation.
- By design, the modulating signal and the output signal may not overlap, allowing the balun structures to act as filters and improve port-to-port isolation.
- Single diode quads handle LO drive levels of more than +19 dBm, delivering input 1 dB compression of +12 dBm and input third order intercept points of +22 dBm.



Automated Laser Sealing

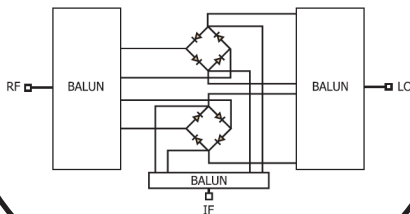
Unlike other mixer companies, APITech routinely laser welds its mixers for *improved hermeticity and environmental integrity*.



We achieve Low Conversion Loss by using diodes screened for low RD and low CT

Optimal diode VF values are always chosen for highest possible LO drive levels which yields high input P1dB & high input IP3 performance

We routinely select the highest possible diode drive levels yielding superior Input P1dB and IP3 performance



High Port to Port Isolation comes from our strict attention to balun design

Triple Balanced Designs

Using a more complex RF structure, APITech's Triple Balanced Mixers feature a pair of quad diode rings and balun structures on all three ports of the mixers. Choosing Triple Balanced Mixers provides wider operating frequency bandwidths, overlapping RF and IF frequency ranges, and higher available LO drive levels of up to +23 dBm. Operating at the higher LO drive results in higher input 1dB compression levels of +15 dBm and input 3rd order intercept points of +26 dBm. Video feedthru is significantly reduced as the balun structures exhibit high pass filter responses, stop-ping all low frequency signals.

Ultrawide bandwidth performance is achieved through the use of ultra low loss Teflon™ board material

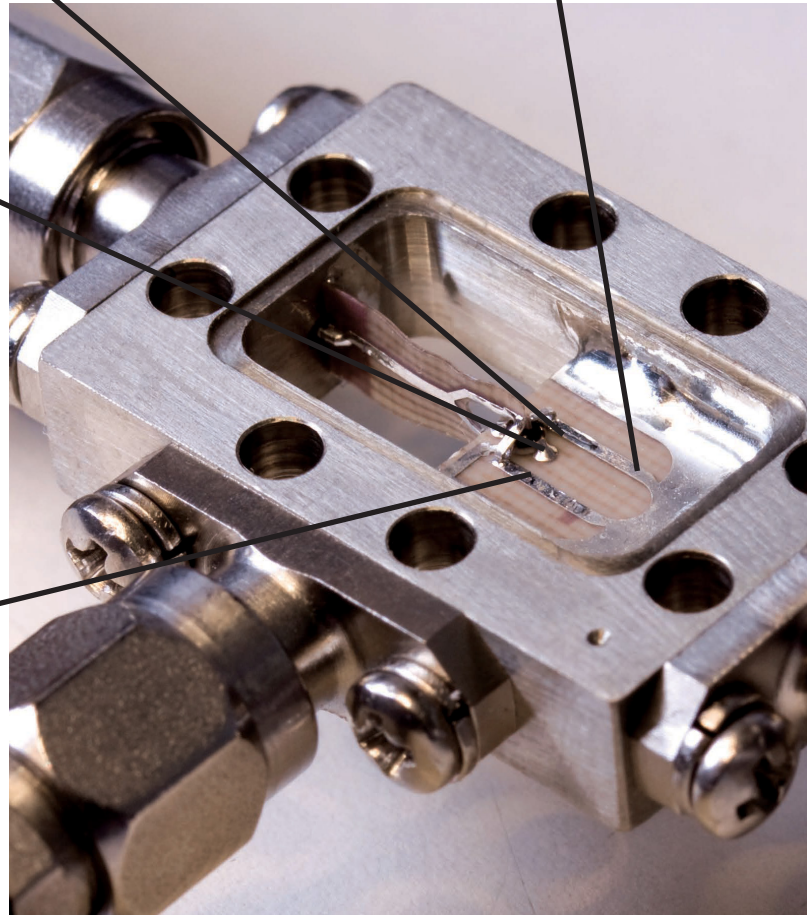
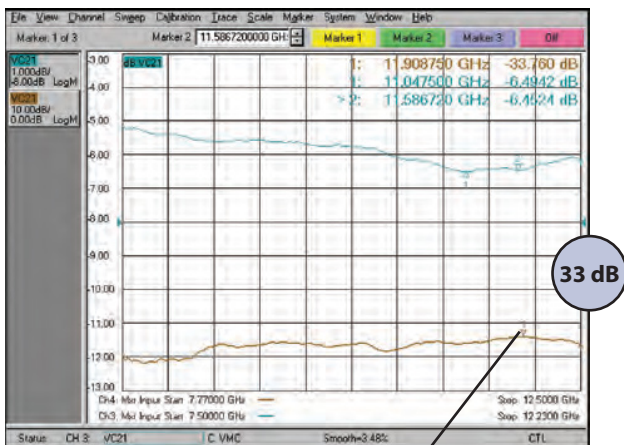




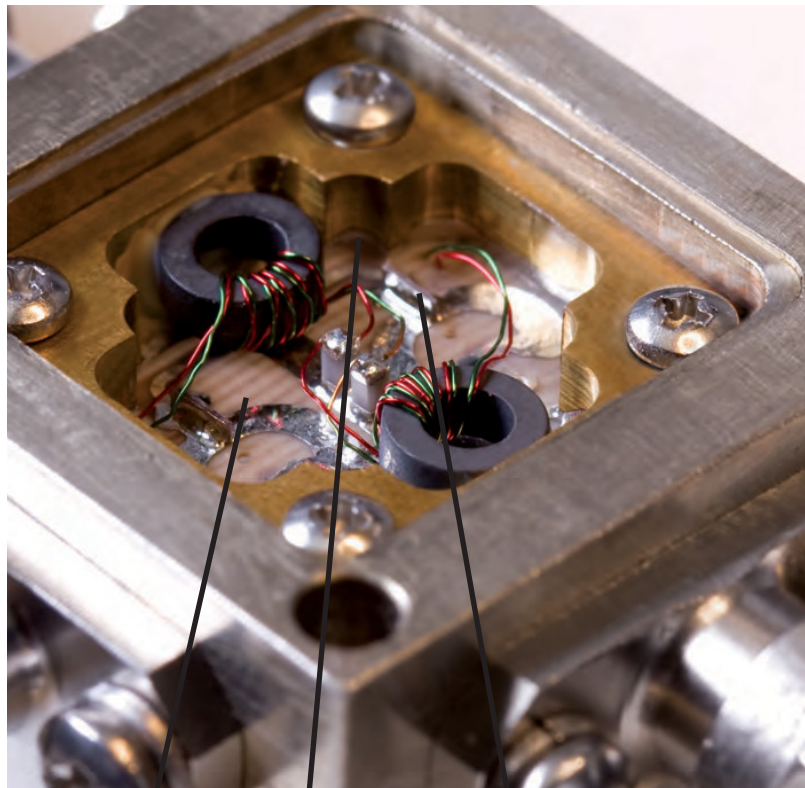
Image Reject / IQ Designs

Undesired noise and signals exhibiting a frequency offset from the LO identical to the desired RF signal corrupt the desired conversion in the form of image distortion. APITech's Image Reject mixers minimize the impact of image noise on the system noise figure compared to the SSB performance. Our Image Reject mixers also suppress by 25 dB the spurious products generated by undesired signals falling in the system's image frequency range. APITech's IQ Mixers solve another challenging system problem by resolving the phase of the incoming signal in 90° increments. Subsequent processing of the IQ output allows the system designer to determine whether the RF signal is on the high or low side of the LO frequency.

High Image Suppression (33 dB) and Low Conversion Loss (6.4 dB).



The key to the amount of image suppression obtained with an IQ mixer is determined by the design's amplitude & phase balance. APITech engineers concentrate on maintaining optimal symmetry in order to obtain the high image suppression needed in today's demanding systems.



Strict attention to the IF quadrature yields superior image suppression.

Superior high image suppression by maintaining a true 90° phase split with minimal loss

Dependable chip and wire topology offers repeatability under high temperatures and extreme conditions



Doublers

APITech's multi-octave spanning Frequency Doublers extend the useful range of lower frequency signal sources. Maximizing the second harmonic of the input signal and minimizing the fundamental and third order products eases the burden on subsequent filtering. Our engineers designed these doublers to be easily dropped into existing oscillator designs providing a tremendous advantage to system designers.



- Quarter wavelength stubs are used to provide diode ground paths and optimize Return Loss
- Synthesized input and output matching networks maintain maximum response flatness across the performance band

The company also focuses its attention on details such as keeping SSB noise low through the use of carefully selected diode bridge quads for low R_D .

With frequency doublers in multi-octave designs from 5 MHz to 10 GHz, APITech engineers know isolation is a key parameter in doubler performance. With all of their standard doublers delivering 25 dB of isolation, it is no wonder APITech is the vendor of choice for engineers who want the best performance as well as the best value.

Full Performance RF/Microwave Mixers

Mixer Model	RF (MHz)		LO (MHz)		IF (MHz)		LO Power (dBm)	CL (dB)	Isolation (dB)		Input P1 dE (dBm)	Input IP3 (dBm)	NF (dB)	Other Package Options
									LO-RF	LO-IF				
MM93MG-40	500	18000	500	18000	DC	300	7	7	12	5	2	11	7.5	PG-40
MM94MG-40	500	18000	500	18000	DC	300	10	7	12	5	5	14	7.5	PG-40
MM96MG-40	500	18000	500	18000	DC	300	14	7	12	5	8	18	7.5	PG-40
MM97MG-40	500	18000	500	18000	DC	300	19	7	12	5	12	23	7.5	PG-40
MM93MG-21	2000	18000	2000	18000	DC	600	7	8.5	20	17	2	10	9	PG-21
MM94MG-21	2000	18000	2000	18000	DC	600	10	8.5	20	17	3	13	9	PG-21
M53T	10	1500	10	1500	DC	800	7	7	28	25	3.5	13	7.5	-
M56T	10	1500	10	1500	DC	800	13	7	27	20	5.5	16	7.5	-
M57T	10	1500	10	1500	DC	1000	23	8.5	30	25	17	27	9	-
MM93MS-1	1800	20000	1800	20000	DC	800	7	7.2	20	12	2	11	7.7	MS-17
MM94MS-1	1800	20000	1800	20000	DC	800	10	7.2	20	12	5	14	7.7	MS-17
MM96MS-1	1800	20000	1800	20000	DC	800	14	7.2	20	12	8	18	7.7	MS-17
MM97MS-1	1800	20000	1800	20000	DC	800	18	7.2	20	12	12	21	7.7	MS-17
M63T	1000	2000	1000	2000	DC	1000	7	8	30	20	3	13	8.5	-
M66T	1000	2000	1000	2000	DC	1000	13	8	30	20	5	15	8.5	-
M67T	1000	2000	1000	2000	DC	1000	23	8	30	20	15	26	8.5	-
M73T	800	2400	800	3500	DC	1500	7	9	20	18	0	10	9.5	-
MM134MG-1	1500	26500	1500	26500	DC	1250	9	9.5	18	18	3	12	10	PG-1
MM43MG-10	2000	8000	2000	8000	DC	1500	7	6.7	25	18	1	11	7.2	PG-10/ML-10/PL-10
MM43MS-10	2000	9000	2000	9000	DC	1500	7	8	20	15	1	11	8.5	MS-17
MM44MG-10	2000	8000	2000	8000	DC	1500	10	6.7	25	18	4	14	7.2	PG-10/ML-10/PL-10
MM44MS-10	2000	9000	2000	9000	DC	1500	10	8	20	15	4	14	8.5	MS-17
MM46MG-10	2000	8000	2000	8000	DC	1500	14	6.7	25	18	8	18	7.2	PG-10/ML-10/PL-10
MM46MS-10	2000	9000	2000	9000	DC	1500	13	8	20	15	8	18	8.5	MS-17
MM47MG-10	2000	8000	2000	8000	DC	1500	19	6.7	25	18	12	22	7.2	PG-13/ML-10/PL-10
MM47MS-10	2000	9000	2000	9000	DC	1500	18	8	20	15	12	22	8.5	MS-17
MM63MG-10	2000	12000	2000	12000	DC	1500	7	7.5	20	18	1	11	8	PG-10/ML-10/PL-10
MM64MG-10	2000	12000	2000	12000	DC	1500	10	7.5	20	18	4	14	8	PG-11/ML-10/PL-10
MM66MG-10	2000	12000	2000	12000	DC	1500	14	7.5	20	18	8	18	8	PG-12/ML-10/PL-10
MM67MG-10	2000	12000	2000	12000	DC	1500	19	7.5	20	18	12	22	8	PG-13/ML-10/PL-10
MM83MS-3	5000	15000	3000	17000	DC	2000	7	8.5	16	15	2	11	9	MS-14
MM84MS-3	5000	15000	3000	17000	DC	2000	10	8.5	16	15	5	14	9	MS-14
MM86MS-3	5000	15000	3000	17000	DC	2000	14	8.5	16	15	8	18	9	MS-14



Full Performance RF/Microwave Mixers

Mixer Model	RF (MHz)		LO (MHz)		IF (MHz)		LO Power (dBm)	CL (dB)	Isolation (dB)		Input P1 dE (dBm)	Input IP3 (dBm)	NF (dB)	Other Package Options
	1	2	3	4	DC	2000			LO-RF	LO-IF				
MO43MG	4000	8000	3500	8500	DC	2000	7	8.5	25	20	1	11	9	PG
MO43MN	4000	8000	3500	8500	DC	2000	7	6.7	25	15	1	11	7.2	MP
MO44MG	4000	8000	3500	8500	DC	2000	10	8.5	25	20	4	14	9	PG
MO44MN	4000	8000	3500	8500	DC	2000	10	6.7	25	15	4	14	7.2	MP
MO46MG	4000	8000	3500	8500	DC	2000	14	8.5	25	20	8	18	9	PG
MO46MN	4000	8000	3500	8500	DC	2000	14	6.7	25	15	8	18	7.2	MP
MO47MG	4000	8000	3500	8500	DC	2000	19	8.5	25	20	12	22	9	PG
MO47MN	4000	8000	3500	8500	DC	2000	19	6.7	25	15	12	22	7.2	MP
MM93SMD	6000	18000	6000	18000	DC	2500	7	6.9	24	25	1	11	7.4	SMD-14/SMH/SMH-14
MM94SMD	6000	18000	6000	18000	DC	2500	10	6.9	24	25	4	14	7.4	SMD-14/SMH/SMH-14
MM96SMD	6000	18000	6000	18000	DC	2500	13	6.9	24	25	8	18	7.4	SMD-14/SMH/SMH-14
MO63MG	6000	12500	5000	15000	DC	2500	7	8.8	25	25	1	11	9.3	PG
MO63MN	6000	12500	5000	15000	DC	2500	7	5.5	25	25	1	11	6	MP
MO64MG	6000	12500	5000	15000	DC	2500	10	8.8	25	25	4	13	9.3	PG
MO64MN	6000	12500	5000	15000	DC	2500	10	5.5	25	25	4	14	6	MP
MO66MG	6000	12500	5000	15000	DC	2500	14	8.8	25	25	8	18	9.3	PG
MO66MN	6000	12500	5000	15000	DC	2500	14	5.5	25	25	8	18	6	MP
MO67MG	6000	12500	5000	15000	DC	2500	19	8.8	25	25	12	22	9.3	PG
MO67MN	6000	12500	5000	15000	DC	2500	19	5.5	25	25	12	22	6	MP
MM93ML	6000	18000	6000	18000	DC	3000	7	7	23	24	2	11	7.5	PL/MN/PN
MM94ML	6000	18000	6000	18000	DC	3000	10	7	23	24	5	14	7.5	PL/MN/PN
MM96ML	6000	18000	6000	18000	DC	3000	14	7	23	24	8	18	7.5	PL/MN/PN
MM97ML	6000	18000	6000	18000	DC	3000	19	7	23	24	12	23	7.5	PL/MN/PN
MC134MN-3	17000	24000	15000	26000	DC	4000	10	8.5	25	20	3	13	9	PN-3
MC134MS-3	17000	24000	15000	26000	DC	4000	10	8.5	25	20	3	13	9	MS-14
MC53MS-5	3500	12000	3500	12000	DC	4000	7	7	30	25	1	11	7.5	MS-14
MC53MS-7	3500	15000	3500	15000	DC	4000	7	7.5	26	21	1	11	8	MS-15
MC53SMD-7	3500	15000	3500	15000	DC	4000	7	7.5	26	21	1	11	8	SMD-14/SMH-7/SMH-14
MC54MS-5	3500	12000	3500	12000	DC	4000	10	7	30	25	4	14	7.5	MS-14
MC54MS-7	3500	15000	3500	15000	DC	4000	10	7.5	26	21	4	14	8	MS-15
MC54SMD-7	3500	15000	3500	15000	DC	4000	10	7.5	26	21	4	14	8	SMD-14/SMH-7/SMH-14
MC56MS-5	3500	12000	3500	12000	DC	4000	14	7	30	25	8	18	7.5	MS-14
MC56MS-7	3500	15000	3500	15000	DC	4000	13	7.5	26	21	8	18	8	MS-15
MC56SMD-7	3500	15000	3500	15000	DC	4000	13	7.5	26	21	8	18	8	SMD-14/SMH-7/SMH-14
MC57MS-5	3500	12000	3500	12000	DC	4000	18	7	30	25	12	22	7.5	MS-14
MC57MS-7	3500	15000	3500	15000	DC	4000	18	7.5	26	21	12	22	8	MS-15
MC57SMD-7	3500	15000	3500	15000	DC	4000	18	7.5	26	21	12	22	8	SMD-14/SMH-7/SMH-14
MM93MG-30	6000	18000	4000	18000	DC	4000	7	6.5	20	20	2	11	7	PG-30
MM93MS-3	4000	20000	4000	20000	DC	4000	7	8.5	20	16	2	11	9	MS-13
MM94MG-30	6000	18000	4000	18000	DC	4000	10	6.5	20	20	5	14	7	PG-30
MM94MS-3	4000	20000	4000	20000	DC	4000	10	8.5	20	16	5	14	9	MS-13
MM96MG-30	6000	18000	4000	18000	DC	4000	14	6.5	20	20	8	18	7	PG-30
MM96MS-3	4000	20000	4000	20000	DC	4000	14	8.5	20	16	8	18	9	MS-13
MM97MG-30	6000	18000	4000	18000	DC	4000	19	6.5	20	20	12	23	7	PG-30
MM97MS-3	4000	20000	4000	20000	DC	4000	18	8.5	20	16	12	21	9	MS-13
MM93MN-11	6000	18000	4000	18000	DC	4500	7	7	22	20	2	11	7.5	PN-11
MM94MN-11	6000	18000	4000	18000	DC	4500	10	7	22	20	5	14	7.5	PN-11
MM96MN-11	6000	18000	4000	18000	DC	4500	14	7	22	20	8	18	7.5	PN-11
MM97MN-11	6000	18000	4000	18000	DC	4500	19	7	22	20	12	23	7.5	PN-11
M24T	1	3400	1	3400	1	2000	10	8.5	25	25	1	14	9	-
MM44MG-1	2000	8000	2000	8000	10	4000	10	7.3	16	23	5	14	7.8	PG-1
MM44MS	1500	9000	1500	9000	10	4000	10	6.5	15	22	5	14	7	MS-15
MM46MG-1	2000	8000	2000	8000	10	4000	13	7.3	16	23	8	17	7.8	PG-1
MM46MS	1500	9000	1500	9000	10	4000	13	6.5	15	22	8	17	7	MS-15
MM47MG-1	2000	8000	2000	8000	10	4000	17	7.3	16	23	12	21	7.8	PG-1
MM47MS	1500	9000	1500	9000	10	4000	17	6.5	15	22	12	21	7	MS-15
MM48MG-1	2000	8000	2000	8000	10	4000	21	7.3	16	23	15	24	7.8	PG-1
MM48MS	1500	9000	1500	9000	10	4000	21	6.5	15	22	15	24	7	MS-15
MM94MG-3	2000	18000	2000	18000	10	4000	10	7.3	15	20	5	14	7.8	PG-3/ML-1/PL-1
MM96MG-3	2000	18000	2000	18000	10	4000	13	7.3	15	20	8	17	7.8	PG-3/ML-1/PL-1
MM97MG-3	2000	18000	2000	18000	10	4000	17	7.3	15	20	12	21	7.8	PG-3/ML-1/PL-1
MM98MG-3	2000	18000	2000	18000	10	4000	21	7.3	15	20	15	24	7.8	PG-3/ML-1/PL-1
MM44MN-1	1500	9000	1000	9000	10	4500	10	8	10	20	5	14	8.5	PN-1
MM46MN-1	1500	9000	1000	9000	10	4500	13	8	10	20	8	17	8.5	PN-1
MM47MN-1	1500	9000	1000	9000	10	4500	17	8	10	20	12	21	8.5	PN-1
MM48MN-1	1500	9000	1000	9000	10	4500	21	8	10	20	15	24	8.5	PN-1
MM94MS	1500	19000	1500	19000	500	6500	10	8	17	20	5	14	8.5	MS-14
MM96MS	1500	19000	1500	19000	500	6500	13	8	17	20	8	17	8.5	MS-14
MM97MS	1500	19000	1500	19000	500	6500	17	8	17	20	12	21	8.5	MS-14
MM98MS	1500	19000	1500	19000	500	6500	21	8	17	20	15	24	8.5	MS-14
MM94MN-1	2000	19000	2000	19000	1000	9000	10	8	15	17	5	14	8.5	PN-1
MM94MS-6	2000	19000	2000	19000	1000	9000	10	8	18	15	5	14	8.5	MS-15
MM96MN-1	2000	19000	2000	19000	1000	9000	13	8	15	17	8	17	8.5	PN-1

Triple Balanced Designs



Full Performance RF/Microwave Mixers

Mixer Model	RF (MHz)		LO (MHz)		IF (MHz)		LO Power (dBm)	CL (dB)	Isolation (dB)		Input P1 dE (dBm)	Input IP3 (dBm)	NF (dB)	Other Package Options
									LO-RF	LO-IF				
MM96MS-6	2000	19000	2000	19000	1000	9000	13	8	18	15	8	17	8.5	MS-15
MM97MN-1	2000	19000	2000	19000	1000	9000	17	8	15	17	12	21	8.5	PN-1
MM97MS-6	2000	19000	2000	19000	1000	9000	17	8	18	15	12	21	8.5	MS-15
MM98MN-1	2000	19000	2000	19000	1000	9000	21	8	15	17	15	24	8.5	PN-1
MM98MS-6	2000	19000	2000	19000	1000	9000	21	8	18	15	15	24	8.5	MS-15
MM94MG-2	2000	18000	2000	18000	1000	12000	10	7	17	17	5	14	7.5	PG-2
MM96MG-2	2000	18000	2000	18000	1000	12000	13	7	17	17	8	17	7.5	PG-2
MM97MG-2	2000	18000	2000	18000	1000	12000	17	7	17	17	12	21	7.5	PG-2
MM98MG-2	2000	18000	2000	18000	1000	12000	21	7	17	17	15	24	7.5	PG-2
MM94MG	6000	18000	6000	18000	1500	8000	10	7.7	20	15	5	14	8.2	PG
MM96MG	6000	18000	6000	18000	1500	8000	13	7.7	20	15	8	17	8.2	PG
MM97MG	6000	18000	6000	18000	1500	8000	17	7.7	20	15	12	21	8.2	PG
MM98MG	6000	18000	6000	18000	1500	8000	21	7.7	20	15	15	24	8.2	PG
MM44MG	2000	8000	2000	8000	2000	6000	10	7.3	16	18	5	14	7.8	PG/ML/PL
MM46MG	2000	8000	2000	8000	2000	6000	13	7.3	16	18	8	17	7.8	PG/ML/PL
MM47MG	2000	8000	2000	8000	2000	6000	17	7.3	16	18	12	21	7.8	PG/ML/PL
MM48MG	2000	8000	2000	8000	2000	6000	21	7.3	16	18	15	24	7.8	PG/ML/PL
MM94ML-15	2000	18000	2000	18000	2000	8000	10	8.5	15	17	5	14	9	PL-15
MM96ML-15	2000	18000	2000	18000	2000	8000	13	8.5	15	17	8	17	9	PL-15
MM97ML-15	2000	18000	2000	18000	2000	8000	17	8.5	15	17	12	21	9	PL-15
MM98ML-15	2000	18000	2000	18000	2000	8000	21	8.5	15	17	15	24	9	PL-15

All specifications listed are typical at 25°C

RF Mixers

Model Numbers	Frequency (MHz)			LO Power (dBm)	CL (dB)	Input P1 (dBm)	Input IP3 (dBm)	Package Style
	RF	LO	IF					
M53T	10-1500	10-1500	DC-800	+7	7.0	+3.5	+13	TO-8
M56T	10-1500	10-1500	DC-800	+13	6.5	+5.5	+16	TO-8
M57	10-1500	10-1500	DC-1000	+23	7.5	+17	+27	TO-8
M63T/M66T/M67T	1000-2000	1000-2000	DC-1000	+7 to +23	8.0	+3 to +15	+13 to +26	TO-8
M73T	800-2400	800-3500	DC-1500	+7	9.0	+1	+10	TO-8
M24T	1-3400	1-3400	1-2000	+10	8.5	+1	+14	TO-8

Octave Band Mixers

Model Numbers	Frequency (MHz)			LO Power (dBm)	CL (dB)	Input P1 (dBm)	Input IP3 (dBm)	Package Style
	RF	LO	IF					
MO4xxG	4.0-8.0	3.5-8.5	DC-2.0	+7 to +19	8.5	+1 to +12	+11 to +22	SMA Connectors
MO4xxN	4.0-8.0	3.5-8.5	DC-2.0	+7 to +19	6.7	+1 to +12	+11 to +22	SMA Connectors
MO6xxG	6.0-12.5	5.0-15.0	DC-2.5	+7 to +19	8.8	+1 to +12	+11 to +22	SMA Connectors
MO6xxN	6.0-12.5	5.0-15.0	DC-2.5	+7 to +19	5.5	+1 to +12	+11 to +22	SMA Connectors



Multi-Octave Band Mixers

Model Numbers	Frequency (MHz)			LO Power (dBm)	CL (dB)	Input P1 (dBm)	Input IP3 (dBm)	Package Style
	RF	LO	IF					
MM4xxG-10	2.0-8.0	2.0-8.0	DC-1.5	+7 to +19	6.7	+1 to +12	+11 to +22	SMA Connectors
MM4xxL-10	2.0-8.0	2.0-8.0	DC-1.5	+7 to +19	6.7	+1 to +12	+11 to +22	SMA Connectors
MM4xSMx-10	2.0-8.0	2.0-8.0	DC-1.5	+7 to +18	8.0	+1 to +12	+11 to +22	Surface Mount
MM4xxG-1	2.0-8.0	2.0-8.0	.01-4.0	+10 to +21	7.3	+5 to +15	+14 to +24	SMA Connectors
MM4xxG	2.0-8.0	2.0-8.0	2.0-6.0	+10 to +21	7.3	+5 to +15	+14 to +24	SMA Connectors
MM4xxL	2.0-8.0	2.0-8.0	2.0-6.0	+10 to +21	7.3	+5 to +15	+14 to +24	SMA Connectors
MM4xxN-1	1.5-9.0	1.0-9.0	.01-4.5	+10 to +21	8.0	+5 to +15	+14 to +24	SMA Connectors
MM4xMS-15	1.5-9.0	1.5-9.0	.01-4.0	+10 to +21	6.5	+5 to +15	+14 to +24	Microstrip Carrier
MM4xMS-10-17	2.0-9.0	2.0-9.0	DC-1.5	+7 to +18	8.0	+1 to +12	+11 to +22	Microstrip Carrier
MM4xMS-1-14	2.0-9.0	2.0-9.0	10-3.0	+10 to +21	7.3	+5 to +15	+14 to +24	Microstrip Carrier
MM6xxG-10	2.0-12.0	2.0-12.0	DC-1.5	+7 to +19	7.5	+1 to +12	+11 to +22	SMA Connectors
MM6xxL-10	2.0-12.0	2.0-12.0	DC-1.5	+7 to +19	7.5	+1 to +12	+11 to +22	SMA Connectors
MC5xMS-5-14	3.5-12.0	3.5-12.0	DC-4.0	+7 to +18	7.0	+1 to +12	+11 to +22	Microstrip Carrier
MC5xSMx-7-14	3.5-15.0	3.5-15.0	DC-4.0	+7 to +18	7.5	+1 to +12	+11 to +22	Surface Mount
MC5xMS-7-15	3.5-15.0	3.5-15.0	DC-4.0	+7 to +18	7.5	+1 to +12	+11 to +22	Microstrip Carrier
MM8xMS-3-14	5.0-15.0	3.0-17.0	DC-2.0	+7 to +14	8.5	+2 to +8	+11 to +18	Microstrip Carrier
MM9xSMx-14	6.0-18.0	6.0-18.0	DC-2.5	+7 to +13	6.9	+1 to +8	+11 to +18	Surface Mount
MM9xxL	6.0-18.0	6.0-18.0	DC-3.0	+7 to +19	7.0	+2 to +12	+11 to +23	SMA Connectors
MM9xxN	6.0-18.0	6.0-18.0	DC-3.0	+7 to +19	7.0	+2 to +12	+11 to +23	SMA Connectors
MM9xxG-30	6.0-18.0	4.0-18.0	DC-4.0	+7 to +19	6.5	+2 to +12	+11 to +23	SMA Connectors
MM9xxN-11	6.0-18.0	4.0-18.0	DC-4.5	+7 to +19	7.0	+2 to +12	+11 to +23	SMA Connectors
MM9xxG	6.0-18.0	6.0-18.0	1.5-8.0	+10 to +21	7.7	+5 to +15	+14 to +24	SMA Connectors
MM9xMS-3-13	4.0-20.0	4.0-20.0	DC-4.0	+7 to +18	8.5	+2 to +12	+11 to +21	Microstrip Carrier

Frequency Doublers

Model Numbers	Frequency (MHz)		LO Power (dBm)	CL (dB)	Isolation (dB)	3rd Harmonic Isolation (dBc)	Package Style
	Input	Output					
FD34H-1	0.005-2.8	0.01-5.6	+11	13.0	25	25	Flatpack
FD34SM-1	0.005-2.8	0.01-5.6	+11	13.0	25	25	Surface Mount
FD34T-15	0.005-2.8	0.01-5.6	+11	13.0	25	25	Modular SMA
FD34TC-15	0.005-2.8	0.01-5.6	+11	13.0	25	25	SMA Connectors
FD9xxN-1	1.5-10.0	3.0-20.0	+11 to +17	12.5	25	20	SMA Connectors
FD9xMS-1	1.5-10.0	3.0-20.0	+11 to +17	13.0	25	20	Microstrip Carrier
FD9xSMx-1	2.0-10.0	4.0-20.0	+11 to +17	13.0	25	20	Surface Mount

APITech's design engineers focus their expertise not only on meeting the customer's requirements, but on exceeding their expectations. Other companies talk about technology. The performance of APITech's designs speaks for themselves.

Unlike some other mixer manufacturers who are reluctant to accept specifications requiring guaranteed performance, APITech actively pursues those requirements, suitable for lab environments as well as extreme temperature environments.



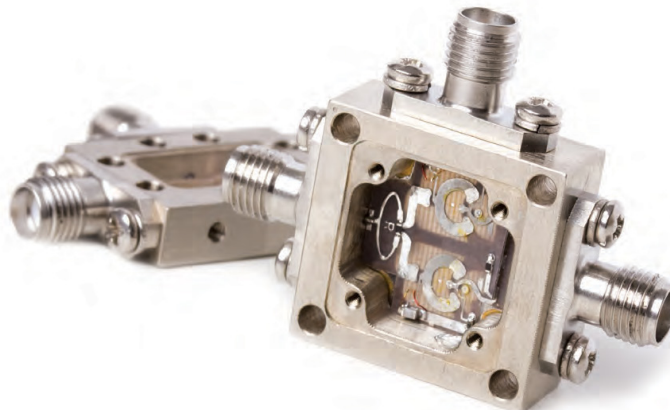
Ultra-Broadband Mixers

Model Numbers	RF	Frequency (MHz)		LO Power (dBm)	CL (dB)	Input P1 (dBm)	Input IP3 (dBm)	Package Style
		LO	IF					
MM9xMS	2.0-18.0	2.0-18.0	2.0-5.0	+10 to +21	8.0	+5 to +15	+14 to +24	Microstrip Carrier
MM9xxG-40	0.5-18.0	0.5-18.0	DC-0.3	+7 to +19	7.0	+2 to +12	+11 to +23	SMA Connectors
MM9xxG-21	2.0-18.0	2.0-18.0	DC-0.6	+7 to +10	8.5	+2 to +3	+10 to +13	SMA Connectors
MM9xxG-3	2.0-18.0	2.0-18.0	.01-4.0	+10 to +21	7.3	+5 to +15	+14 to +24	SMA Connectors
MM9xxL-1	2.0-18.0	2.0-18.0	.01-4.0	+10 to +21	7.3	+5 to +15	+14 to +24	SMA Connectors
MM9xxL-15	2.0-18.0	2.0-18.0	2.0-8.0	+10 to +21	8.5	+5 to +15	+14 to +24	SMA Connectors
MM9xxG-2	2.0-18.0	2.0-18.0	1.0-12.0	+10 to +21	7.0	+5 to +15	+14 to +24	SMA Connectors
MM9xxN-1	2.0-19.0	2.0-19.0	1.0-9.0	+10 to +21	8.0	+5 to +15	+14 to +24	SMA Connectors
MM9xMS-6-15	2.0-19.0	2.0-19.0	1.0-9.0	+10 to +21	8.0	+5 to +15	+14 to +24	Microstrip Carrier
MM9xMS-1-17	1.8-20.0	1.8-20.0	DC-0.8	+7 to +18	7.2	+2 to +12	+11 to +23	Microstrip Carrier
MM134xG-1	1.5-26.5	1.5-26.5	DC-1.25	+9	9.5	+3	+12	SMA Connectors

IQ Mixer/Modulators & Image Reject Mixers

Model Numbers	RF	Frequency (MHz)		LO Power (dBm)	CL (dB)	Input P1 (dBm)	Input IP3 (dBm)	Package Style
		LO	IF					
MIQ2xMS-1	1.4-2.8	1.4-2.8	DC-0.5	+10 to +17	6.0	+22	+14 to +21	Microstrip Carrier
MIQ2xMS-2	1.9-4.2	1.9-4.2	DC-0.5	+10 to +17	6.0	+26	+14 to +21	Microstrip Carrier
MIQ3xMS-3	3.0-6.0	3.0-6.0	DC-0.3	+10 to +17	6.5	+28	+14 to +21	Microstrip Carrier
MIQ5xMS-1	5.6-9.0	5.6-9.0	DC-0.5	+10 to +17	5.0	+32	+14 to +21	Microstrip Carrier
MIQ5xSMD-1	5.6-9.0	5.6-9.0	DC-0.5	+10 to +17	5.0	+32	+14 to +21	Surface Mount
MIQ6xMS-1	5.5-13.5	5.5-13.5	DC-0.5	+10 to +17	5.3	+28	+14 to +21	Microstrip Carrier
MIQ6xSMD-1	5.5-13.5	5.5-13.5	DC-0.5	+10 to +17	5.3	+28	+14 to +21	Surface Mount
IRM5xMS-1	5.6-9.0	5.6-9.0	.05-.09	+10 to +17	5.0	+26	+14 to +21	Microstrip Carrier

All specifications listed are typical at 25°C





Watkins-Johnson M/A-COM Mixer Cross Reference List

Watkins-Johnson M/A-COM	APITech	Watkins-Johnson M/A-COM	APITech
M2G	MW73T	MY82	MW96ML-1
M2GC	MW73TC	MY82C	MW96PL-1
M4A	MW57H	M83	MW96ML-1
SM4A	MW57SM	M83C	MW96PL-1
M4B	M57H-1MW	MY83H	MW98ML-1
M4G	MW73H	MY83HC	MW98PL-1
SM4G	MW73SM	MY84	MW64MG-10
M8H-3	MW63TL-10	MY84C	MW64PG-10
M8HC-3	MW63CL-10	M85C	MW93CG-21
M8H-7	MW43TG-10	MY85	MW93MG-21
M8HC-7	MW43CG-10	MY85C	MW93PG-21
M9H	MW57T	M87C	MW96CG-3
M9HC	MW57TC	MY87	MW96MG-3
M62	MW44MG-10	MY87C	MW96PG-3
M62C	MW44CG-10	M88C	MW96CN-1
M63	MW44EG-10	MY88	MW96MN-1
M63C	MW44CG-11	MY88C	MW96PN-1
MY63	MW44MG-11	M88HC	MW98CL-15
MY63C	MW44PG-10	MY88H	MW98ML-15
M63H	MW48EG-10	MY88HC	MW98PL-15
M63HC	MW48CG-10	M89C	MW94CN-1
MY63H	MW48MG-10	MY89	MW94MN-1
MY63HC	MW48PG-10	MY89C	MW94PN-1
M67	MW94ML	M93C	MW94CL-1
M67C	MW94CL	MY93	MW94ML-1
M74	MW94ML-2	MY93C	MW94PL-1
M74C	MW94CL-2	MZ6310	MW64MG-11
M76	MW64ML-10	MZ6310C	MW64PG-11
M76C	MW64PL-10	MZ7407	MW93ML
MY76	MW64ML-10	MZ7407C	MW93PL
MY76C	MW64PL-10	MZ7410	MW94ML-4
M76H	MW68ML-10	MZ7410C	MW94PL-4
M76HC	MW68CL-10	MZ7420	MW98ML
MY76H	MW68ML-10	MZ7420C	MW98PL
MY76HC	MW68PL-10	MZ8810	MW94MN-2
M77	MW94ML-3	MZ8810C	MW94PN-2
M77C	MW94CL-3	MZ8813	MM96MN-2
MY77	MW94ML-3	MZ8813C	MW96PN-2
MY77C	MW94PL-3	MZ9310	MM94MG-3
M79	MW94MN	MZ9310C	MM94PG-3
M79C	MW94CN	MZ9313	MW96MG-4
M79H	MW98MN	MZ9313C	MW96PG-4
M79HC	MW98CN	FD25	FD34T-15
M80	MW93MG-30	FD25C	FD34TC-15
M80C	MW93PG-30	FD25E	FD34H-15
M80L	MW90MG-30	SFD25	FD34SM-15
M80LC	MW90PG-30		

Better Pricing, Delivery, and Service

APITech offers Form, Fit & Function Cross Referenced Units to other manufacturers' old, obsolete and long lead-time mixers.



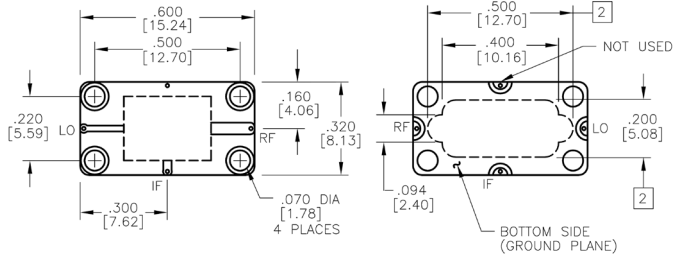


Marki Microwave Mixer Cross Reference List

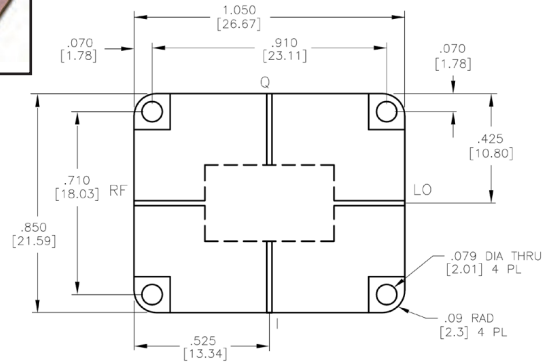
Marki Microwave	APITech	Marki Microwave	APITech
M1-0208LC	MK43GP-1	M2H-0220ME	MK94MS-3
M1-0208MC	MK44GP-1	M2H-0220NE	MK95MS-3
M1-0208NC	MK46GP-1	M2H-0220HE	MK96MS-3
M1-0208HC	MK47GP-1	M2H-0220LP	MK93LXP-1
M1-0208SC	MK48GP-1	M2H-0220MP	MK94LXP-1
M1-0208LE	MK43MS-1	M2H-0220NP	MK95LXP-1
M1-0208ME	MK44MS-1	M2H-0220HP	MK96LXP-1
M1-0208NE	MK46MS-1	M3-0408LE	MK43MS-2
M1-0208HE	MK47MS-1	M3-0408ME	MK44MS-2
M1-0208SE	MK48MS-1	M3-0408NE	MK46MS-2
M1-0212LC	MK63GP-1	M3-0408HE	MK47MS-2
M1-0212MC	MK64GP-1	M3-0408SE	MK48MS-2
M1-0212NC	MK65GP-1	M3-0408LP	MK43LXP-1
M1-0212HC	MK66GP-1	M3-0408MP	MK44LXP-1
M1-0212SC	MK67GP-1	M3-0408NP	MK46LXP-1
M1-0212LE	MK63MS-1	M3-0408HP	MK47LXP-1
M1-0212ME	MK64MS-1	M3-0408SP	MK48LXP-1
M1-0212NE	MK65MS-1	M3-0412LE	MK53MS-3
M1-0212HE	MK66MS-1	M3-0412ME	MK54MS-3
M1-0212SE	MK67MS-1	M3-0412NE	MK56MS-3
M1-0412LC	MK53GP-1	M3-0412HE	MK57MS-3
M1-0412MC	MK54GP-1	M3-0412SE	MK58MS-3
M1-0412NC	MK55GP-1	M3-1013LE	MK53MS-4
M1-0412HC	MK56GP-1	M3-1013ME	MK54MS-4
M1-0412SC	MK57GP-1	M3-1013NE	MK56MS-4
M1-0412LE	MK53MS-1	M3-1013HE	MK57MS-4
M1-0412ME	MK54MS-1	M3-1013SE	MK58MS-4
M1-0412NE	MK55MS-1	M3-3643LE	MK53MS-5
M1-0412HE	MK56MS-1	M3-3643ME	MK54MS-5
M1-0412SE	MK57MS-1	M3-3643NE	MK56MS-5
M1-0420LC	MK93GP-1	M3-3643HE	MK57MS-5
M1-0420MC	MK94GP-1	M3-3643SE	MK58MS-5
M1-0420NC	MK96GP-1	M4-0220LC	MK93GP-4
M1-0420HC	MK97GP-1	M4-0220MC	MK94GP-4
M1-0420SC	MK98GP-1	M4-0220NC	MK96GP-4
M1-0420LE	MK93MS-1	M4-0220HC	MK97GP-4
M1-0420ME	MK94MS-1	M4-0220LE	MK93MS-4
M1-0420NE	MK96MS-1	M4-0220ME	MK94MS-4
M1-0420HE	MK97MS-1	M4-0220NE	MK96MS-4
M1-0420SE	MK98MS-1	M4-0220HE	MK97MS-4
M1-0520LC	MK93GP-2	IQ-0714LXT	MK194SMD-1
M1-0520MC	MK94GP-2	IQ-0714MXT	MK196SMD-1
M1-0520NC	MK96GP-2	D-0001LA	MKD34LP-1
M1-0520HC	MK97GP-2	D-0001LB	MKD34LP-2
M1-0520SC	MK98GP-2	D-0001LC	MKD34GP-1
M1-0520LE	MK93MS-2	D-0001LE	MKD34MS-1
M1-0520ME	MK95MS-2	D-0001LP	MKD34LXP-1
M1-0520NE	MK96MS-2	D-0204LC	MKD96GP-1
M1-0520HE	MK97MS-2	D-0204MC	MKD97GP-1
M1-0520SE	MK98MS-2	D-0204LE	MKD96MS-1
M2H-0220LA	MK93LP-1	D-0204ME	MKD97MS-1
M2H-0220MA	MK94LP-1	D-0210LC	MKD96GP-2
M2H-0220NA	MK95LP-1	D-0210MC	MKD97GP-2
M2H-0220HA	MK96LP-1	D-0210LE	MKD96MS-2
M2H-0220LB	MK93LP-2	D-0210ME	MKD97MS-2
M2H-0220MB	MK94LP-2	D-0210LP	MKD96LXP-1
M2H-0220NB	MK95LP-2	D-0210MP	MKD97LXP-1
M2H-0220HB	MK96LP-2	D-0308LC	MKD96GP-3
M2H-0220LC	MK93GP-3	D-0308MC	MKD97GP-3
M2H-0220MC	MK94GP-3	D-0308LE	MKD96MS-3
M2H-0220NC	MK95GP-3	D-0308ME	MKD97MS-3
M2H-0220HC	MK96GP-3	D-0308LP	MKD96LXP-2
M2H-0220LE	MK93MS-3	D-0308MP	MKD97LXP-2



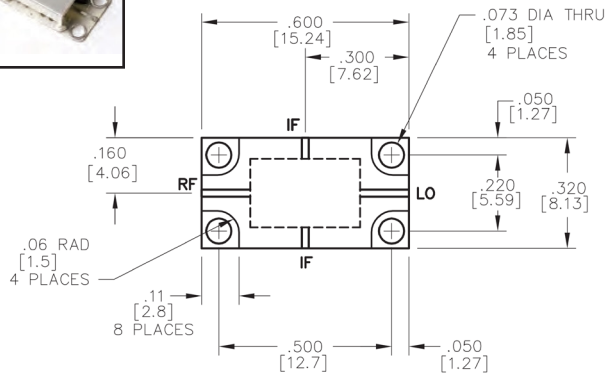
SMMD3



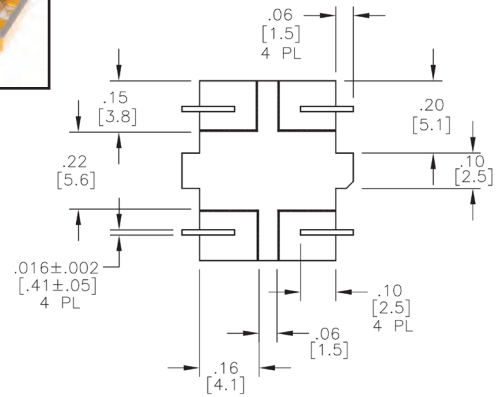
MSQ8



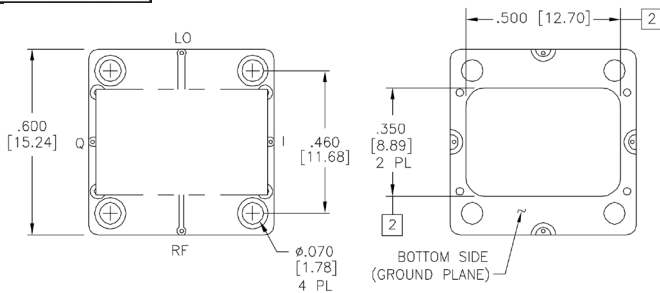
MS3



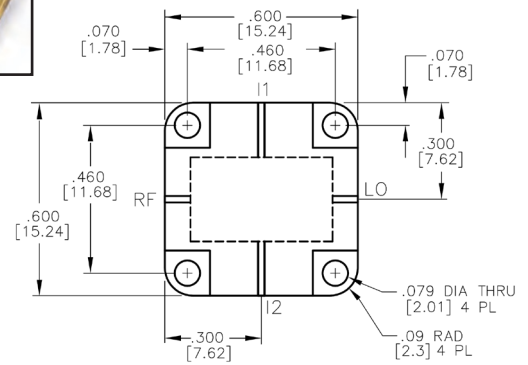
SMM4

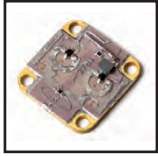


SMQD7

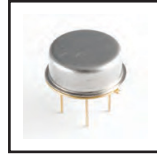
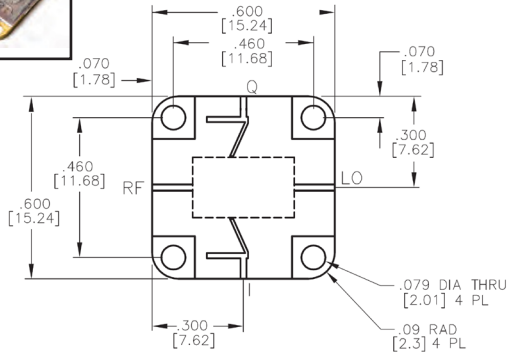


MSR7

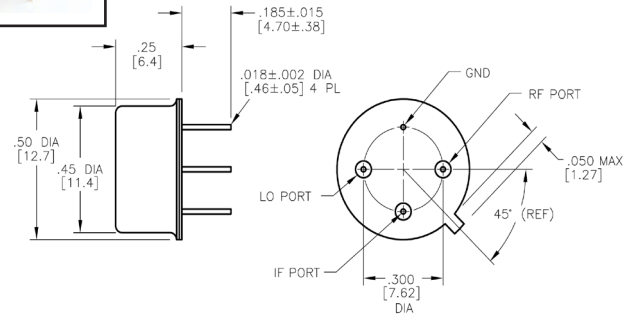




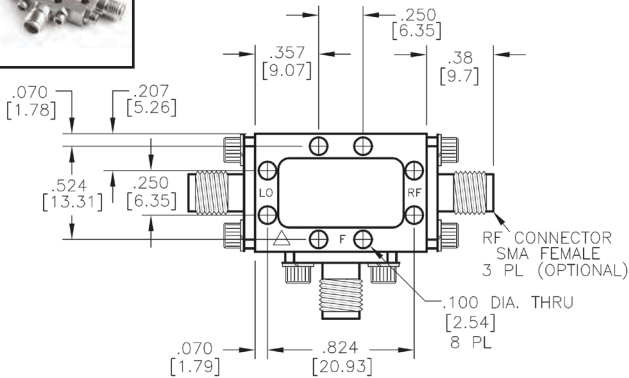
MSQ7



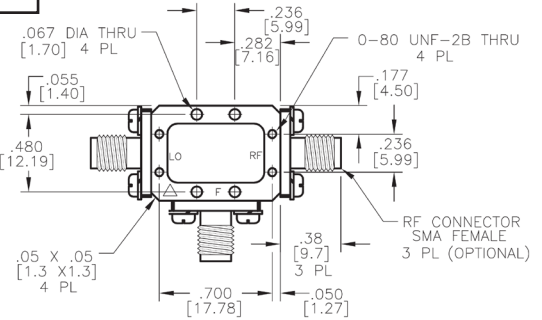
T0-8



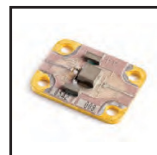
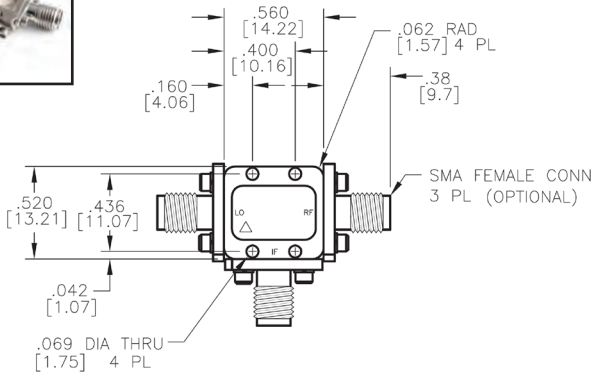
G



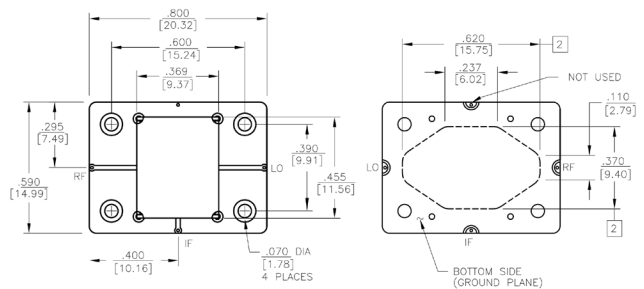
L



N



SMMH



*Note: Dimensions in inches (mm). Illustrations noted here are for reference only. For a list of controlled outline drawings, please refer to micro.apitech.com



Who We Are

Value-added Integration from Components to Subsystem Solutions

APITech provides rugged, reliable, and efficient subsystems, assemblies, and components for use in the most mission critical defense and military applications, supporting government programs throughout the world. With diverse program experience and preferred supplier status with some of the industry's top premier contractors, our precision-engineered MIL-grade products are ideal for applications where uncompromised reliability and uninterrupted performance is required. APITech is the Electromagnetic Spectrum Innovator at Tier 2.5-4 in the supply chain.

SYSTEMS INTEGRATION
SYSTEM PRIME



F-35

MISSION/INTEGRATED SYSTEMS
TIER 1



Radar or Communications

INTEGRATED SUBSYSTEMS & BOXES
TIER 2



Radio or Interface Assembly

MODULES
TIER 3



IMAS

COMPONENTS
TIER 4



Passive COAX

The Electromagnetic Spectrum Innovator

APITech is an innovative designer and manufacturer of high performance systems, subsystems, assemblies and components for technically demanding RF, microwave, millimeterwave, electromagnetic, power, and security applications. A high reliability technology pioneer with over 70 years of heritage, APITech's products are used by global defense, industrial, and commercial customers in applications spanning radar, electronic warfare, unmanned systems, missile defense, harsh environments, space, communications, medical, test and instrumentation, and more.



www.apitech.com | 855.294.3800

CONTACT US