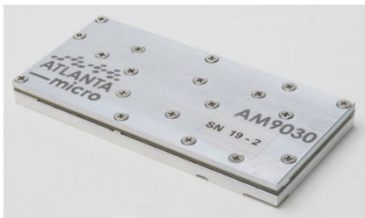


AM9030 – Upconverter

0.9 GHz to 18 GHz Wideband Upconverter Module

High performance and low SWaP (size, weight and power)

- Fully integrated upconverter module provides high dynamic range coverage from 0.9 to 18 GHz
- Also provides a bypass path from 10 MHz to 3 GHz for direct spectrum transmission
- Multiple channels can be configured to work together for coherent operation and N-channel applications



AM9030 is a fully integrated upconverter module that provides high dynamic range coverage from 0.9 GHz to 18 GHz. The upconverter also provides a bypass path from 10 MHz to 3 GHz for direct spectrum transmission. The heterodyne architecture is designed for high performance and low size, weight, and power (low SWaP) and is mechanically mountable to a host circuit board for use in multi-channel transmit applications.

Sub-octave postselector filters, driver amplifiers, local oscillators, frequency converters, power and control line filtering, temperature sensor, and a control FPGA are included. The analog IF input frequency is centered at 2 GHz with a 1 GHz instantaneous bandwidth. Multiple channels can be configured to work together for coherent operation and N-channel applications. Interfacing to the upconverter is accomplished by simply providing an IF input, DC voltages, frequency reference, SPI control, and connecting the RF output.

FEATURES

- 0.9 GHz to 18 GHz Frequency Range
- 1-GHz Instantaneous Bandwidth
- 2 GHz IF center Frequency
- 10 MHz to 3 GHz Tuner Bypass Path
- Sub-Octave Output Filter
- Integrated Temperature Sensor
- 6 dB Gain
- Up to +10 dBm Output Power
- +20 dBm OIP3
- +80 dBc Second Harmonic
- +5.0V and +3.3V DC Operation
- 5.5 W Max Power Consumption
- -40°C to +85°C Operation
- 1.40" x 3.00" x 0.270" (35.6 x 76.2 x 6.8 mm)

Note: This is an overview version of the AM9018 datasheet. Contact MMIC Sales for the full datasheet: MMICsales@mrchy.com.

CONTENTS

FEATURES 1

BLOCK DIAGRAM..... **Error! Bookmark not defined.**

REVISION HISTORY2

PART ORDERING DETAILS3

SPECIFICATIONS3

TYPICAL PERFORMANCE..... **Error! Bookmark not defined.**

CONNECTOR AND PIN DEFINITIONS..... **Error! Bookmark not defined.**

MECHANICAL DETAILS.....5

EVALUATION PC BOARD.....6

REVISION HISTORY

Date	Revision	Notes
April 22, 2020	0	Initial Release.
October 11, 2021	0.1	General Corrections.
November 16, 2021	1	Updated Datasheet Format.
September 6, 2022	1.1	Added Eval Board Ordering Configurations and Information.
November 15, 2022	2	Modified Part Description. Added more information to eval board configuration options.
August 5, 2024	3	Changed to Mercury branding. No content changes.

PART ORDERING DETAILS

Part Number	Description
AM9030-1	Stand-alone Tuner Module, 2.0 GHz IF Input w/ 1 GHz Bandwidth
AM9030-1EVAL	Single Channel AM9030-1 Evaluation Board
AM9030-1EVAL-2CH	Dual Channel AM9030-1 Evaluation Board
AM9018-30TR-EVAL	Dual Channel Transmit/Receive Evaluation Board. Includes one AM9018 18 GHz Receiver Module and one AM9030 18 GHz Transmitter Module on a single evaluation board.

Note: Eval boards include low-dropout regulators, reference distribution circuitry, and control circuitry. All that is required for operation is an input signal, a reference, and a Windows computer for the USB control of the evaluation board. See “Evaluation PC Board” section for more details. The output may be driven into a spectrum analyzer or into an antenna. Contact Mercury for ADC recommendations.

SPECIFICATIONS

Absolute Maximum Ratings

	Test Cond	Minimum	Maximum
RF Input Power	Continuous Wave		0.25 W
+5.0 VDC Supply			+5.5 V
+3.3 VDC Supply			+3.6 V
Operating Temperature		-40 C	+85 C
Storage Temperature Range		-55 C	+150 C

Note: Any device operation beyond the Absolute Maximum Ratings may result in permanent damage to the device. The values listed in this table are extremes and do not imply functional operation of the device at these or any other conditions beyond what is listed under Recommended Operating Conditions. Any part subjected to conditions outside of what is recommended for an extended amount of time may suffer from reliability concerns.

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C



Mercury products are electrostatic sensitive.
Follow safe handling practices to avoid damage.

Recommended Operating Conditions

	Minimum	Typical	Maximum
Operating Case Temperature	-40 C		+71 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
+5 VDC Supply		+4.8 V	+5.0 V	+5.2 V
+3.3 VDC Supply		+3.2 V	+3.3 V	+3.5 V
+5 VDC Current				0.4 A
+3.3 VDC Current				1.05 A
Power Dissipated				5.5 W
Logic Level Low		0 V		+0.8 V
Logic Level High		+2.0 V		+3.5 V

RF Performance¹

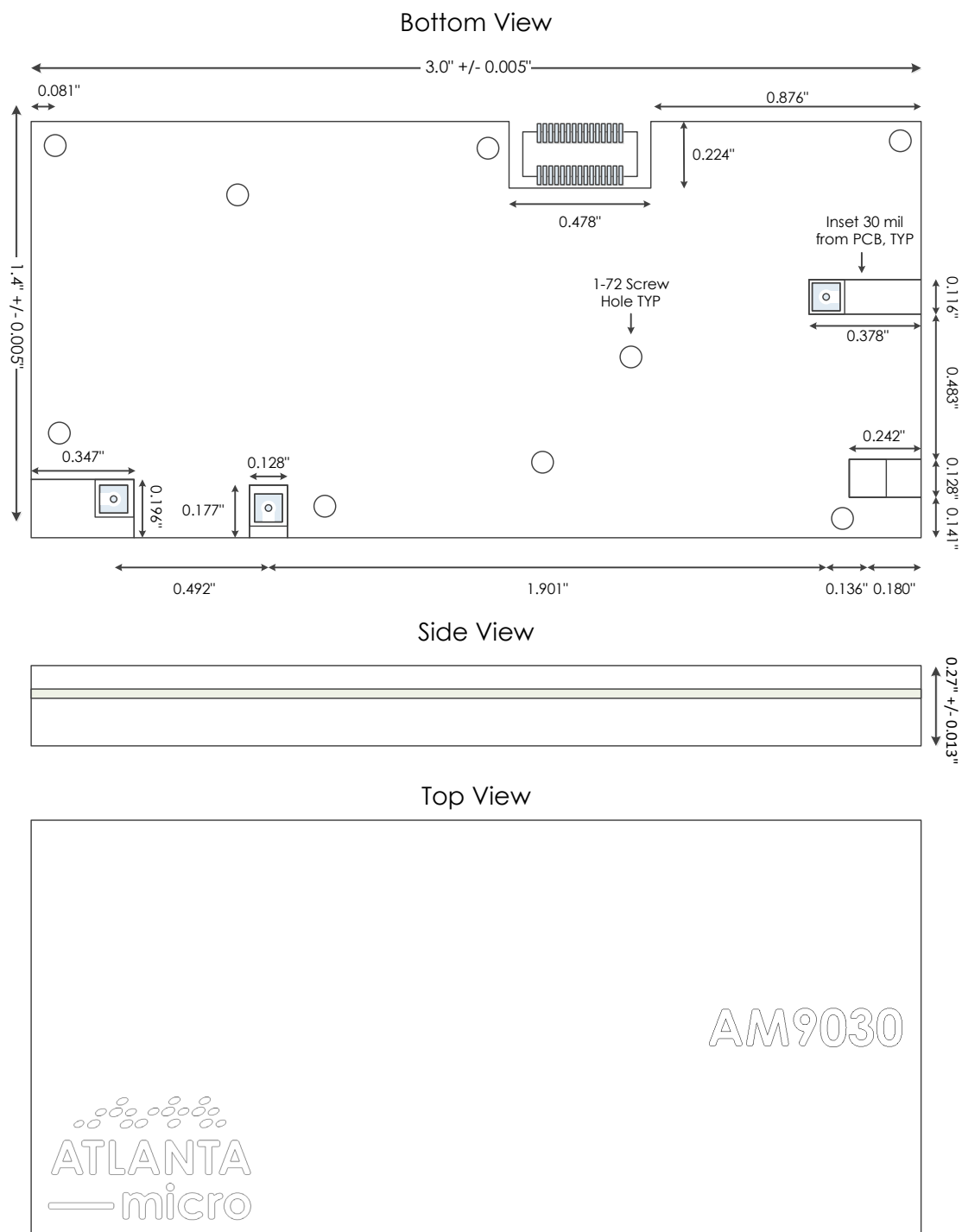
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range	Heterodyne Path	0.9 GHz		18 GHz
	Bypass Path	10 MHz		3 GHz
Instantaneous Bandwidth			1.0 GHz	
IF Center Frequency			2.0 GHz	
Tune Frequency Range		1.4 GHz		17.5 GHz
Tuning Step Size			5 MHz	
Frequency Reference	External Reference Required		100 MHz, 0 dBm	
Output IP3			+20 dBm	
Output Second Harmonic			80 dBc	
Output P1dB			10 dB	
Image Rejection		70 dB		
IF Rejection	Stopband Relative to Passband	50 dB	60 dB	
LO Radiation	Measured at RF Output		-80 dBm	-60 dBm
Gain	Measured at Tune Freq.		6 dB +/-2dB	
Gain Control ¹			16 dB	
Tuning Speed			100 μ s	450 μ s ²
Phase Noise	1 kHz Offset		-90 dBc/Hz	
	10 kHz Offset		-100 dBc/Hz	
	100 kHz Offset		-100 dBc/Hz	
	1 MHz Offset		-106 dBc/Hz	
	10 MHz Offset		-127 dBc/Hz	

Note 1: Additional gain control beyond calibrated gain, in 1 dB steps. Heterodyne path only.**Note 2:** Longest tune speed is seen when switching from $F_c \leq 5500$ to $F_c > 5500$ or from $F_c > 5500$ to $F_c \leq 5500$. Switching between center frequencies in either $F_c \leq 5500$ range or $F_c > 5500$ range will follow typical tuning speed.

MECHANICAL DETAILS

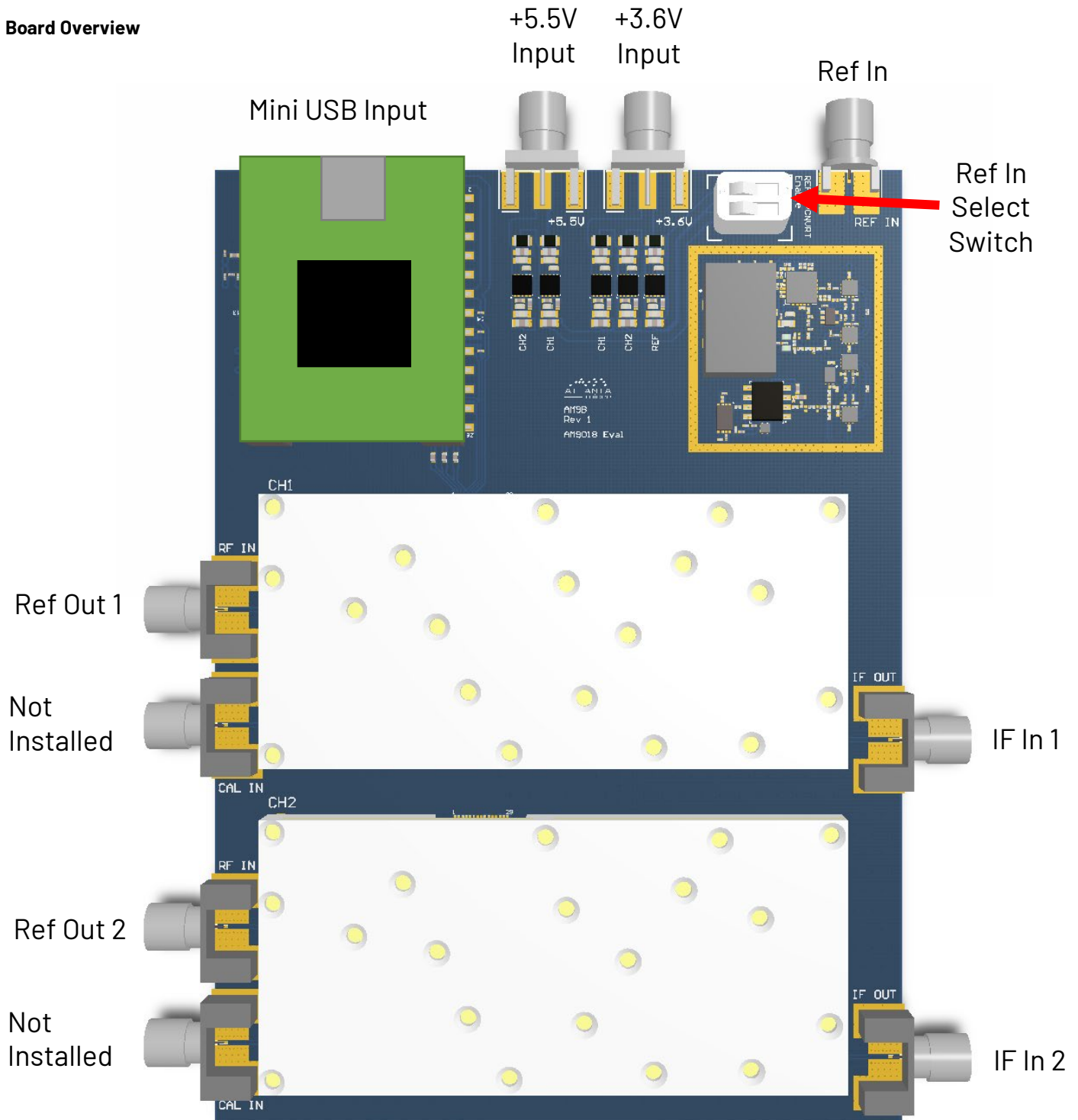
Mechanical Drawing



Note: See Recommended PCB Footprint on next page for hole locations.

EVALUATION PC BOARD

Board Overview



***Note 1:** Evaluation Board supports up to two tuners to test phase coherent operation if desired.



Corporate Headquarters

50 Minuteman Road
Andover, MA 01810 USA
+1 978.967.1401 tel
+1 866.627.6951 tel
+1 978.256.3599 fax

International Headquarters

Mercury International

Avenue Eugène-Lance, 38
PO Box 584
CH-1212 Grand-Lancy 1
Geneva, Switzerland
+41 22 884 5100 tel

Learn more

Visit: mrcy.com

For pricing details, contact: MMICsales@mrcy.com

For technical details, contact: MMICsupport@mrcy.com



The Mercury Systems logo is a registered trademark of Mercury Systems, Inc. Other marks used herein may be trademarks or registered trademarks of their respective holders. Mercury products identified in this document conform with the specifications and standards described herein. Conformance to any such standards is based solely on Mercury's internal processes and methods. The information contained in this document is subject to change at any time without notice.



© 2024 Mercury Systems, Inc. 3-0-2024-08-05-DS-AM9030