

AM9030 – Transmitter Mini-Module

0.9 GHz to 18 GHz Wideband Miniature Tuner Module



Description

AM9030 is a fully integrated tuner module that provides high dynamic range coverage from 0.9 GHz to 18 GHz. The tuner also provides a bypass path from 10 MHz to 3 GHz for direct spectrum transmission. The heterodyne tuner module 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 receiver applications.



Sub-octave preselectors, pre-amplifiers, local oscillators, frequency converters, ADC driver amplifiers, power and control line filtering, a temperature sensor, and a control FPGA are included. The analog IF input frequency is centered at 2 GHz with a 1 GHz bandwidth.

Multiple tuner sets can be configured to work together for coherent operation and N-channel applications. Interfacing to the tuner 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 Bandwidth
- 2 GHz IF Input 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
- -40C to +85C Operation
- 1.40" x 3.00" x 0.270" (35.6 x 76.2 x 6.8 mm)

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
AM90-1830TR-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 Atlanta Micro for ADC recommendations.

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Revision History

Date	Revision Number	Notes
April 22, 2020	0	Initial Specs
October 11, 2021	0.1	Preliminary Release
November 16, 2021	1.0	Initial Release
September 6, 2022	1.1	Modified Features List

Specifications

Absolute Maximum Ratings

	Testing Condition	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



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Operating Case Temperature	-40 C		+85 C

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DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
+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 Performance

(T = 25 °C unless otherwise specified)

Parameter	Notes	Minimum	Typical	Maximum
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.



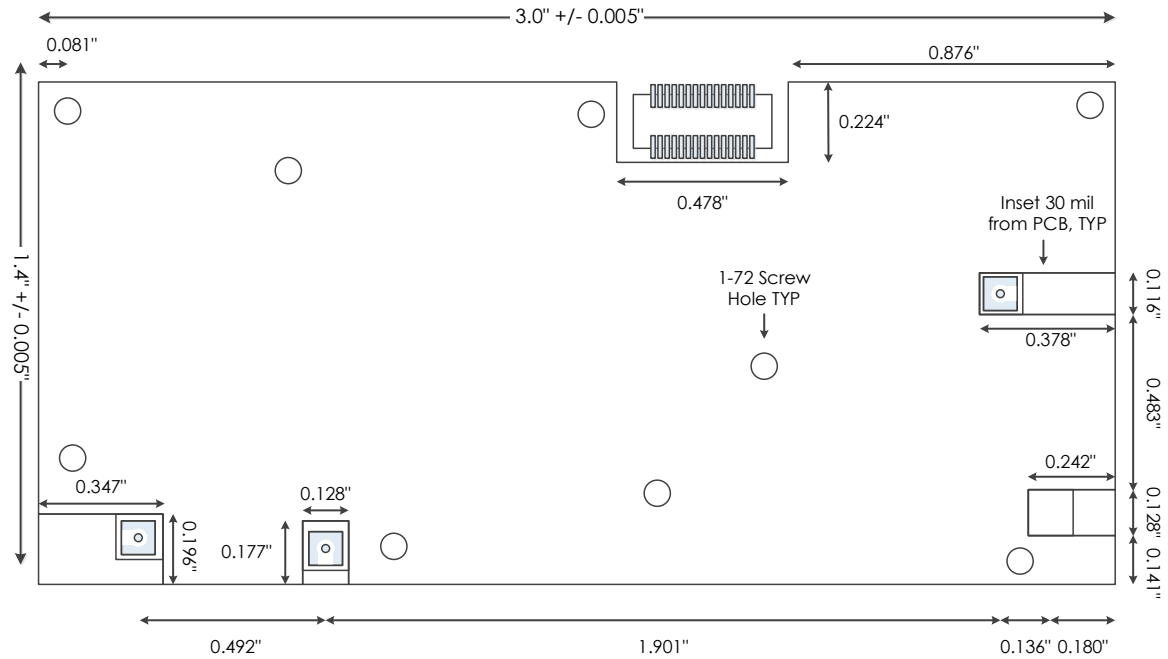
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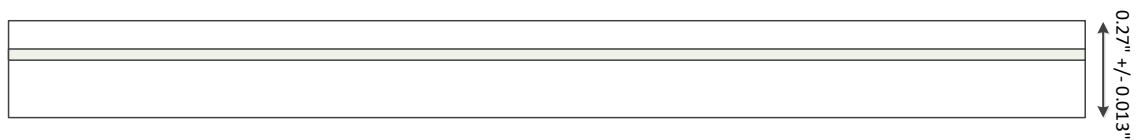
Mechanical Details

Mechanical Drawing

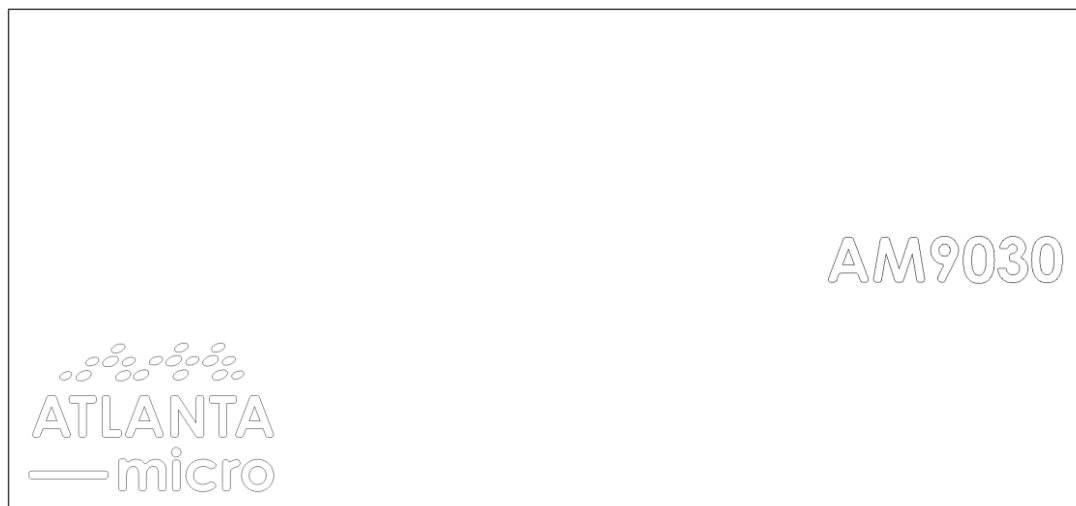
Bottom View



Side View



Top View



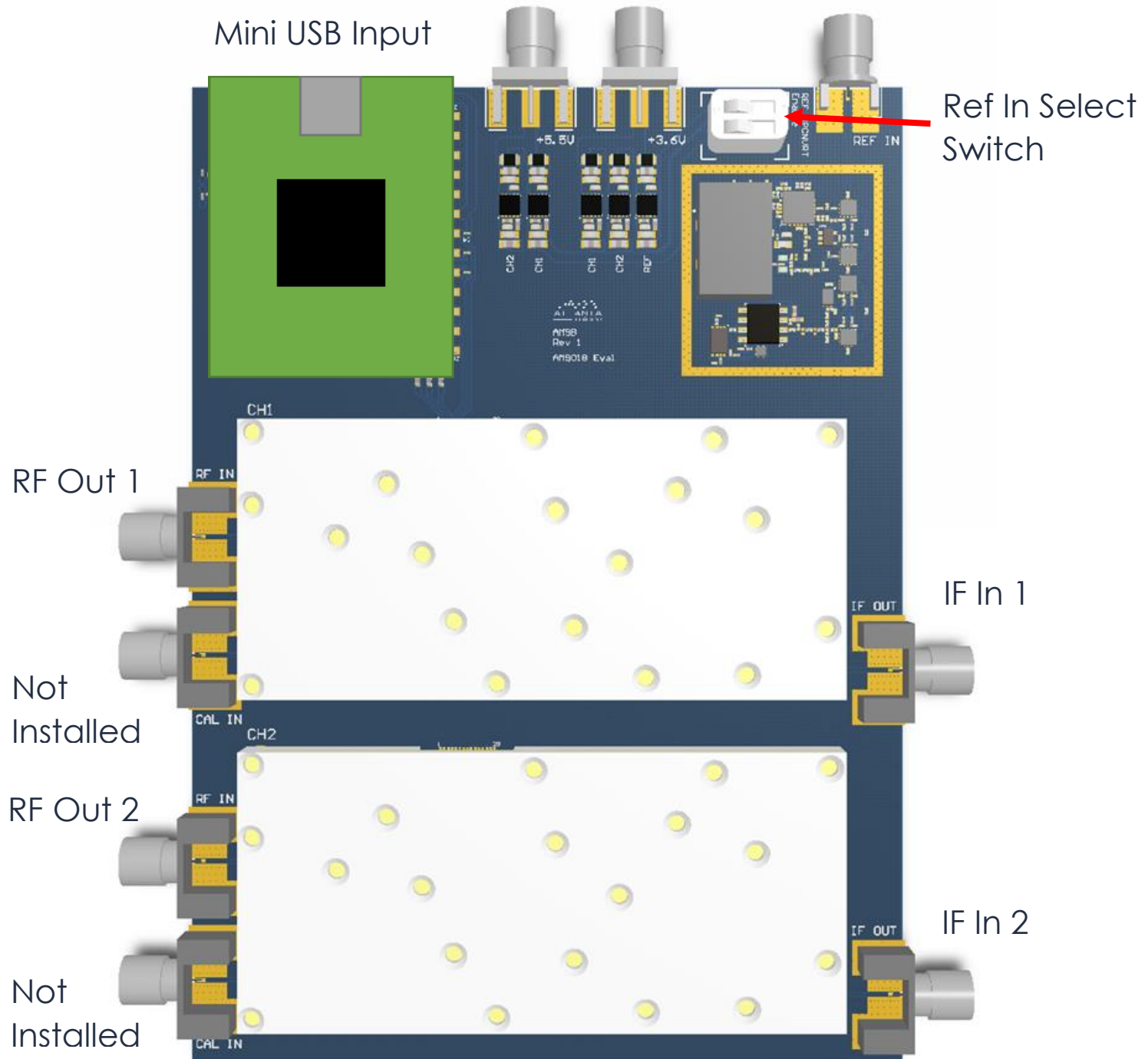
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Evaluation PC Board

Board Overview

+5.5V Input +3.6V Input Ref In



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