

*RADIO MODULE*  
**MTX-103**

**UHF AM TRANSMITTER MODULE**

PRELIMINARY

**DATA SHEET**

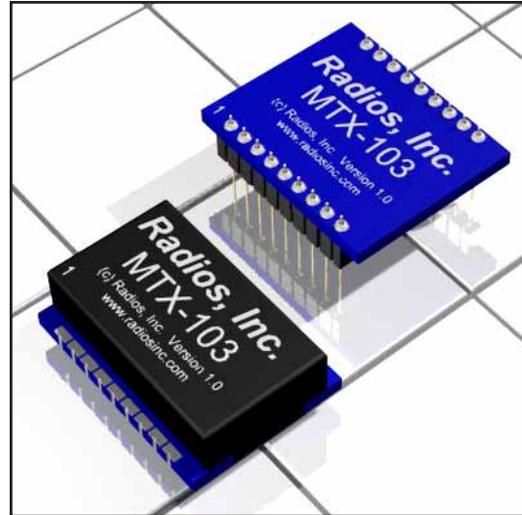
***Radios, Inc.***

November 9, 2007 Preliminary Data Sheet

# MTX-103

## UHF AM TRANSMITTER MODULE

The MTX-103 is an on-off keyed (OOK) and amplitude shift keyed (ASK) high performance, ultra compact, long range transmitter for remote wireless applications. The transmitter operates at the 902-928 MHz band, and is primarily intended for use in part 15.247 and 15.249 systems. Because all tuning is automatic and the transmitter functions are completely integrated, this module is both a highly reliable and low cost solution for high volume wireless applications. An external antenna is the only component required, therefore the MTX-103 can be easily integrated into other applications, which has the benefit of eliminating design and production costs and improving time to market.



The MTX-103 employs a unique feature which tunes the antenna to the internal UHF synthesizer. The transmitter normally complies with worldwide UHF unlicensed band intentional radiator regulations, and also is compatible with virtually all ASK/OOK receiver types. The MTX-103 is designed to work with transmitter data rates up to 115k bits per second. The automatic tuning coupled with a preset PA level ensures that the transmitter output power remains constant at maximum regulatory transmit power limits for the life of the battery. When used with the family of MRX receivers, the MTX-103 provides an inexpensive and reliable wireless solution that is suitable for a wide variety of RF applications, specifically OEM applications.

### Key Features

- Low cost
- Wide supply voltage range
- Commonly employed RKE frequencies
- Wide operating temperature range
- Easily integrated
- Supports On-Off Keying
- Low power consumption
- Compact surface-mount packages/Small Size
- Data rate up to 115 kbps
- Power down pin
- No production tuning

### Typical Applications

- Remote controls
- Garage openers / Gate controls
- Keyless entry
- Lighting control
- Home / Industrial automation
- Continuous / Periodic data transfer
- Remote access
- Guard patrol / Lone worker protection
- Domestic / Commercial security
- Fire / Security alarms
- General wire elimination

### Contact Information

Radios, Inc.  
1408 Center Avenue  
Oostburg, WI 53070

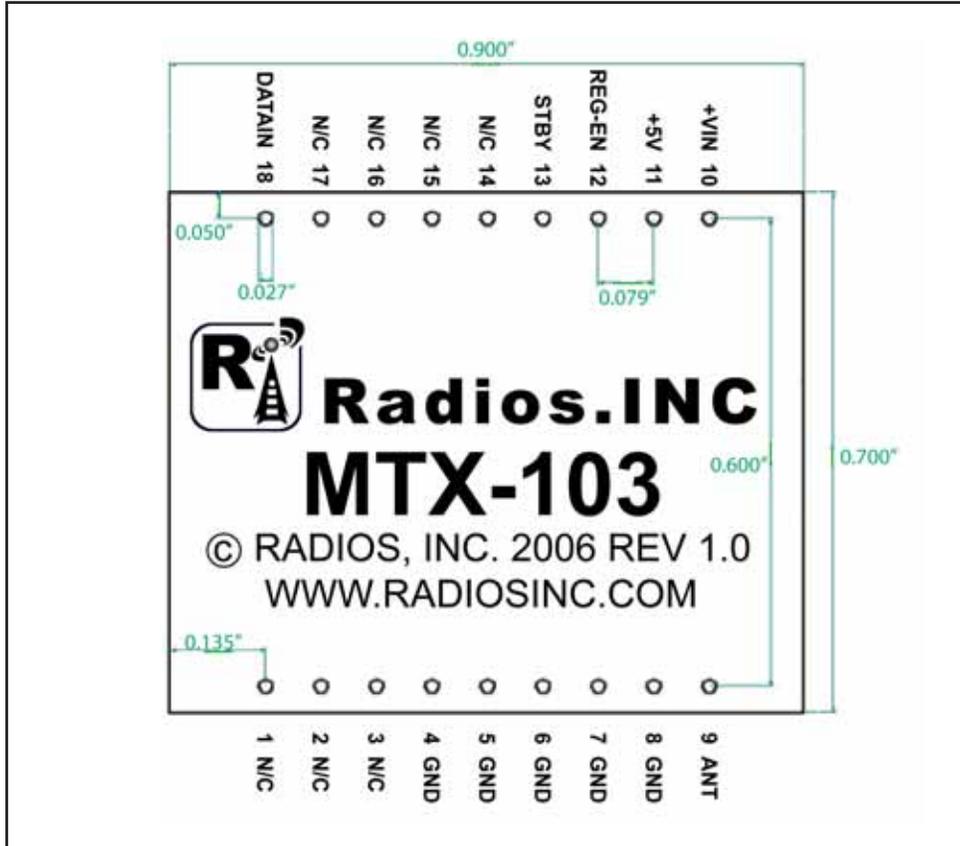
Phone: 920-564-6622  
Fax: 920-564-6630  
Email: sales@radiosinc.com

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## UHF AM TRANSMITTER MODULE

### Mechanical and Pin Diagram DIP Package

\* Note: Pinouts of surface mount and through-hole packages are mirrored



### DIP Package

#### Pin Description

Pin Num	Pin Name	Description	Pin Num	Pin Name	Description
Pin 1	N/C	No Connect	Pin 10	+VIN	Positive Supply Pin (5-16V)
Pin 2	N/C	No Connect	Pin 11	+5V	Regulated Output (5V)
Pin 3	N/C	No Connect	Pin 12	REG-EN	Regulator Enable (2-VCC)
Pin 4	Gnd	Ground	Pin 13	STBY	Standby Control Pin (0-5V)
Pin 5	Gnd	Ground	Pin 14	N/C	No Connect
Pin 6	Gnd	Ground	Pin 15	N/C	No Connect
Pin 7	Gnd	Ground	Pin 16	N/C	No Connect
Pin 8	Gnd	Ground	Pin 17	N/C	No Connect
Pin 9	Ant	RF Output (50 Ohms)	Pin 18	DATAIN	Data Input (0-5V)

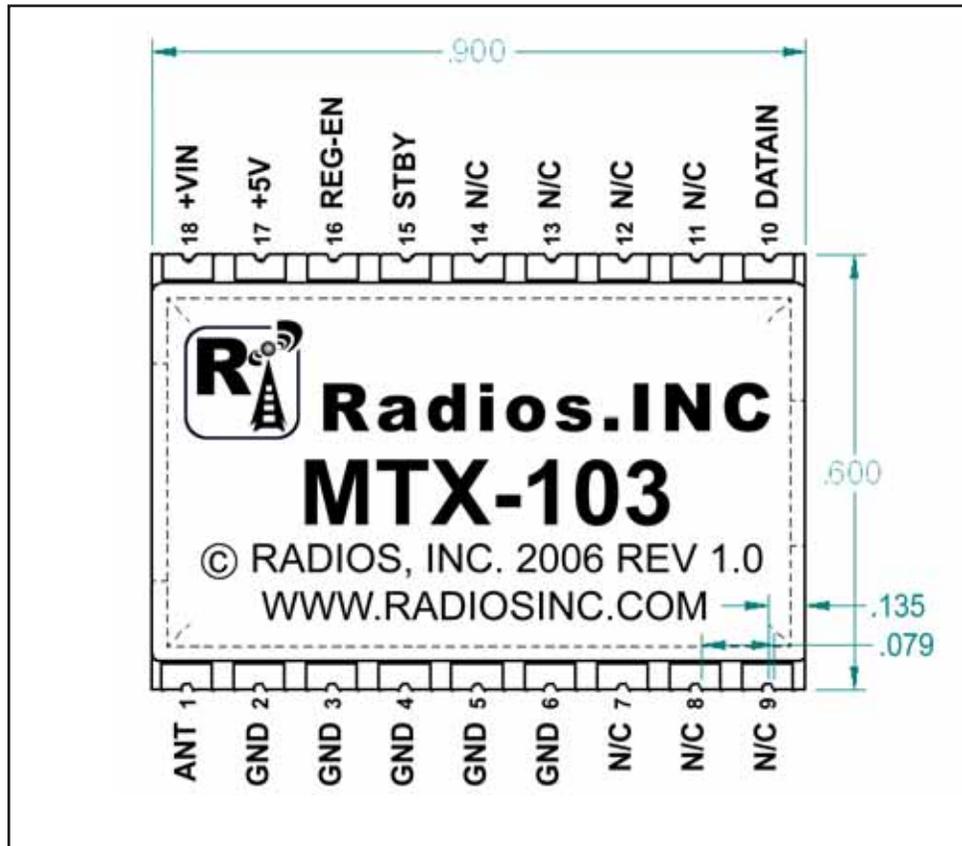
\*\* Verify pin configurations are correct before connecting power or resulting damage may occur.

# MTX-103

## UHF AM TRANSMITTER MODULE

### Mechanical and Pin Diagram Surface Mount Package

\* Note: Pinouts of surface mount and through-hole packages are mirrored



### Surface Mount Package

#### Pin Description

Pin Num	Pin Name	Description	Pin Num	Pin Name	Description
Pin 1	Ant	RF Output (50 Ohms)	Pin 10	DATAIN	Data Input (0-5V)
Pin 2	Gnd	Ground	Pin 11	N/C	No Connect
Pin 3	Gnd	Ground	Pin 12	N/C	No Connect
Pin 4	Gnd	Ground	Pin 13	N/C	No Connect
Pin 5	Gnd	Ground	Pin 14	N/C	No Connect
Pin 6	Gnd	Ground	Pin 15	STBY	Standby Control Pin (0-5V)
Pin 7	N/C	No Connect	Pin 16	REG-EN	Regulator Enable (2-VCC)
Pin 8	N/C	No Connect	Pin 17	+5V	Regulated Output (5V)
Pin 9	N/C	No Connect	Pin 18	+VIN	Positive Supply Pin (5-16V)

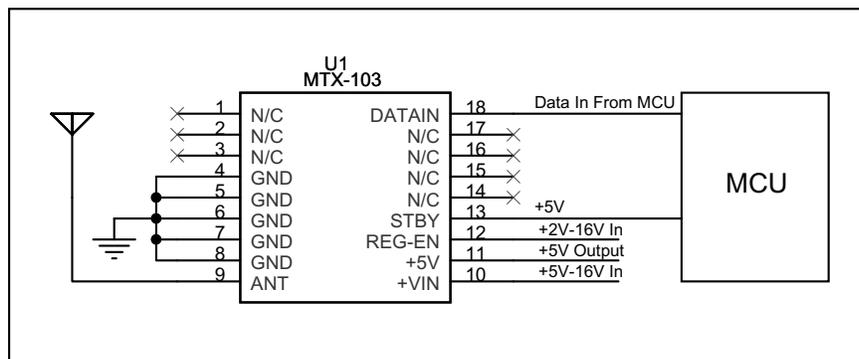
\*\* Verify pin configurations are correct before connecting power or resulting damage may occur.

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## UHF AM TRANSMITTER MODULE

Pin Detail			
Pin Number		Pin Name	Description
DIP	Surface Mount		
9	1	Ant	This is the transmit RF output, internally ac-coupled. Connect this pin to the transmit antenna.
4,5,6,7,8	2,3,4,5,6	Gnd	Ground
1,2,3,14,15,16,17	7,8,9,11,12,13,14	N/C	No Connect
18	10	DATAIN	Amplitude Shift Key modulation data input pin.
13	15	STBY	Input for transmitter stand-by control pin is pulled to VCC for transmit operation and GND for stand-by mode. Internally pulled-up to VCC.
12	16	REG-EN	In a regulated module, this pin powers on the module with a 2-16V supply input. Pulling this pin low disables module. In a non-regulated module, this is a no connect.
11	17	+5V	In a regulated module, this is a 5V output from the onboard regulator when REG-EN is high (2-16V). In a non-regulated module, this is the 4.75V to 5.5V power supply input.
10	18	+VIN	In a regulated module, this is the power supply pin of the module. Input 5-16V to power a regulated module. In a non-regulated module, this is a no connect.

### Typical Application Schematic



MTX-103, 915 MHz

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## UHF AM TRANSMITTER MODULE

### Electrical Limits

Sym	Parameters	Min	Typ	Max	Unit	Notes
<b>Absolute Maximum Ratings</b>						
VCC	Supply Voltage - Regulated	5		16	V	
	Supply Voltage - Not Regulated	4.75		5.5	V	
	Storage Temperature Range	0		70	°C	
	Lead Temperature		300		°C	
V <sub>EN</sub>	Enable Input Voltage	0		16	V	
<b>Operating Ratings</b>						
	Maximum Supply Ripple Voltage			10	mV	
	PC Input Range	0.1		0.4	V	
V <sub>EN</sub>	Enable Input Voltage	0		VCC	V	
TA	Ambient operating temperature	0		70	°C	

### Electrical Characteristics

This device is ESD sensitive. Do not operate or store near strong electrostatic fields. Use appropriate ESD precautions. All voltages are with respect to Ground.

Parameters	Test Conditions	Min	Typ	Max	Unit
<b>Power Supply</b>					
Operating Current			21		mA
MARK/SPACE Ratio	33% @868MHz		16		mA
	33% @915MHz		17		mA
Standby supply current			0.1		µA
MARK supply current	@868MHz		19	26.5	mA
	@915MHz		20	27.5	mA
SPACE supply current	@868MHz		14	18	mA
	@915MHz		15	21	mA
Quiescent Current	REG-EN <= 0.4V (shutdown)		0.01		µA
Operating Voltage	Regulated	5		16	V
	Not Regulated	4.75		5.5	V
<b>RF Output Section and Modulation Limits</b>					
Maximum Power Level	@868MHz		-3		dBm
	@915MHz		-3		dBm
Output Power Variation	over supply and temperature		±2		dBm
Extinction ratio for ASK		38	45		dBc
<b>Digital Section</b>					
Calibration time	Note 6, ASK=HIGH		20		ms
Power amplifier output hold off time from STBY	Note 4, STDBY transition from LOW to HIGH Crystal, ESR < 20ohms		5		ms
Transmitter Stabilization Time from STBY	From External Reference (500mVpp) Crystal, ESR < 20ohms		9		ms
			12		ms
Maximum Data Rate	Duty cycle of modulating signal=50%	115			kbits/s
STBY HIGH	enable voltage	0.8VCC			V
STBY LOW				0.1VCC	V
ASK pin	Input high voltage	0.8VCC		0.1VCC	V
	Input low voltage				V
ASK input current	ASK = 0V, 5.0V input current	-10	0.1	10	µA

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## UHF AM TRANSMITTER MODULE

### Electrical Characteristics - CONT.

Regulator Enable Input					
Input Low Voltage	Regulator OFF			0.6	V
Input High Voltage	Regulator ON	2.0			V
Enable Input Current	REG-EN = 0.6V; Regulator OFF		0.01		μA

**Note 1.** Exceeding the absolute maximum rating may damage the device.

**Note 2.** The device is not guaranteed to function outside its operating rating.

**Note 3.** Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

**Note 4.** After the release of the STDBY, the device requires an initialization time to settle the REFOSC and the internal PLL. The first MARK state (ASK HIGH) after exit from STDBY needs to be longer than the initialization time. The subsequent low to high transitions will be treated as data modulation whereby the envelope transition time will apply.

**Note 5.** For the ASK modulation scheme, the part will accept ASK (digital ON/OFF) input and will transmit the data with a finite extinction ratio and the pin will set the MARK power level.

**Note 6.** When the MICRF103 is first powered up or it loses power momentarily, it goes into the calibration mode to tune up the transmit antenna.

PRELIMINARY

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### **UHF AM TRANSMITTER MODULE**

#### **Technical Support:**

Radios, Inc. is committed to providing its customers with excellent technical support and the resources necessary to assist them with their product development. All technical support is provided free of charge. Customers have several options to obtain assistance. First, any questions or concerns can be e-mailed to Radios, Inc. at [information@radiosinc.com](mailto:information@radiosinc.com). We monitor our e-mail daily, and will respond to all questions promptly. Additionally, to speak directly to a technical support representative, customers can call Radios, Inc. at 920-564-6622.

#### **Compliance:**

Embedded wireless modules are intended for use as component devices which require peripheral elements to operate. Radios, Inc.'s modules are intended to be used in products requiring compliance. They are, however, not pre-approved by the FCC or any other agency worldwide unless so stated. The user or customer understands that regulatory compliance may be required prior to the sale or operation of the module or development system, and agrees to abide by all laws governing the module's or development system's use in the country of operation.

The approval process of embedded wireless modules in the United States is relatively uncomplicated. The Federal Communications Commission (FCC) is the governing body in the US that specifies its requirements in the Code of Federal Regulations (CFR), Title 47. Title 47 consists of several volumes and it is necessary to first identify the correct section that applies to your application. These rules require that a device which intentionally creates RF emissions be FCC compliant; i.e., pre-tested for compliance and assigned an identification number. Radios, Inc. offers pre-screening at one of our affiliate test sites. Final certification is then accomplished by an independent test laboratory. After passing compliance testing, you will be issued a unique ID number which must be placed on each product manufactured.

Any questions dealing with interpretations of the rules relating to testing or compliance should be addressed to:

FCC  
Equipment Authorization Division  
Customer Service Branch, MN 1300F2  
7435 Oakland Mills Road  
Columbia, MD 21046

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### **UHF AM TRANSMITTER MODULE**

#### **Returns:**

Products may be returned directly to Radios, Inc. for evaluation. Returns, without exception, must have a valid RMA number attached. RMA numbers can be obtained by calling a customer service representative at Radios, Inc. If a product is found to be defective and is returned within 90 days of purchase, Radios, Inc. may repair or replace, at its option, said defective product. The warranty does not apply to any products which have been disassembled, modified or subjected to conditions exceeding the application specifications. Under no circumstances will Radios, Inc. be responsible for losses, financial or other, arising from the use or failure of a device in an application or for losses arising from failure to meet delivery requirements, other than the repair, replacement, or refund limited to the original product purchase price. No other warranties, express, implied, or statutory, including warranty of fitness for a particular purpose, apply.

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# MTX-103

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### Editorial Information:

(Date)  
Last Updated November 9, 2007 PRELIMINARY

### Product Ordering Information:

MTX-103 - 915 D 4800 R A -B

