RADIO MODULE

MTX-102

UHF AM TRANSMITTER MODULE

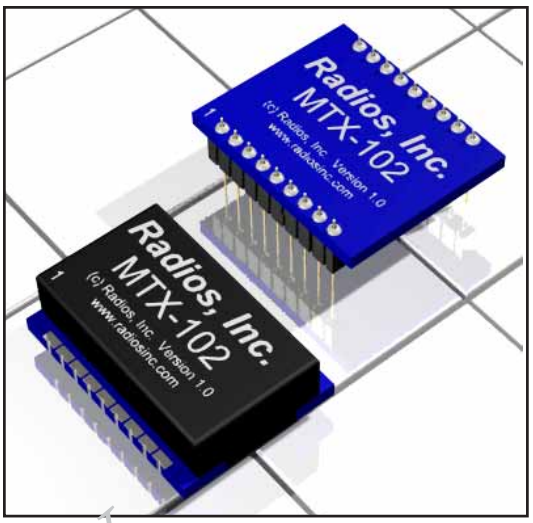
DATA SHEET

Radios, Inc.

November 9, 2007 Preliminary Data Sheet

MTX-102

UHF AM TRANSMITTER MODULE



The MTX-102 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 315, 390, 418, and 433 MHz, and is primarily intended for use in part 15.231 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-102 can be easily integrated into other applications, which has the benefit of eliminating design and production costs and improving time to market.

The MTX-102 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-102 is designed to work with transmitter data rates from 100 to 20k bits per second. The automatic tuning coupled with a preset PA level ensures that the transmitter output power remains constant for the life of the battery. When used with the family of MRX receivers, the MTX-102 provides an inexpensive and reliable wireless soluion that is suitable for a wide variety of RF applications, specifically OEM applications.

Key Features

- Low cost
- Commonly employed RKE frequencies
- Wide operating temperature range
- Easily integrated
- Low power consumption
- Compact surface-mount packages/Small size
- Data rate to 20kbps
- Continuous duty cycle
- Power down pin
- No production tuning
- Fast enable time
- 6mA current consumption at 5V

Typical Applications

- Remote controls
- Garage openers / Gate controls
- Keyless entry
- Lighting control
- Periodic data transfer
- Remote access
- Guard patrol / Lone worker
- Domestic / Commerical security
- Fire / Security alarms
- General wire elimination

Contact Information	
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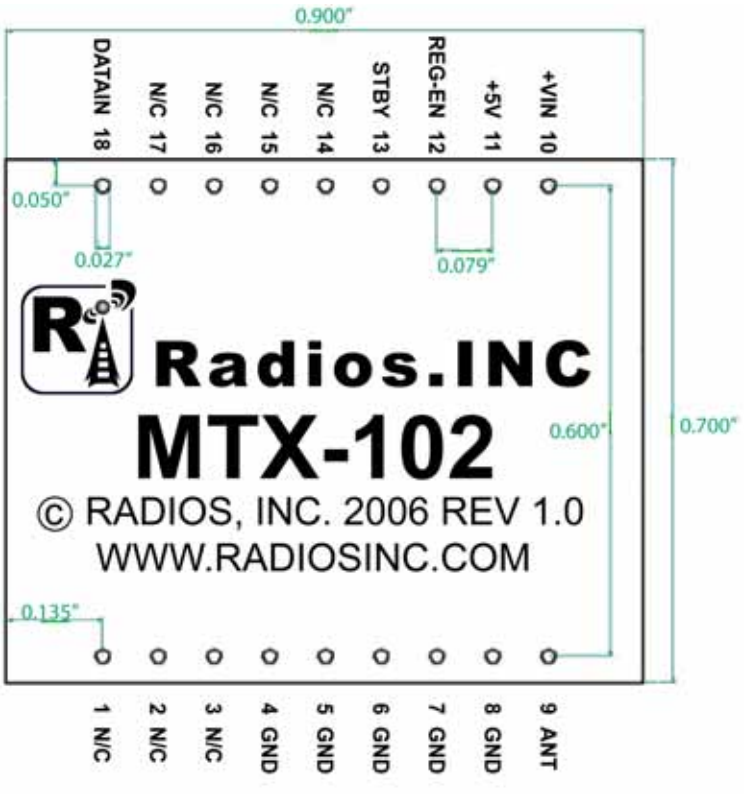
UHF AM TRANSMITTER MODULE

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.

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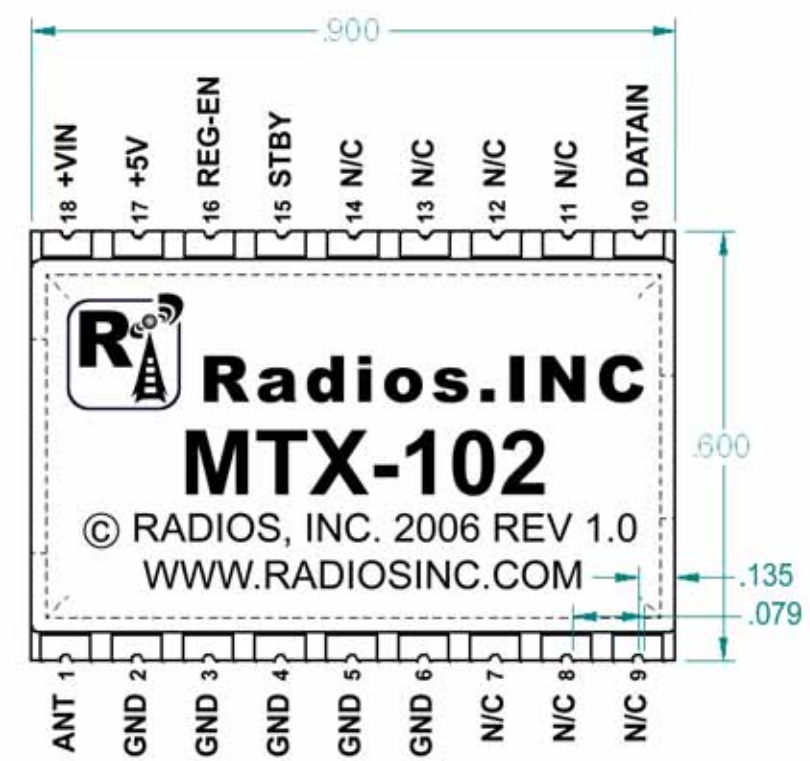
UHF AM TRANSMITTER MODULE

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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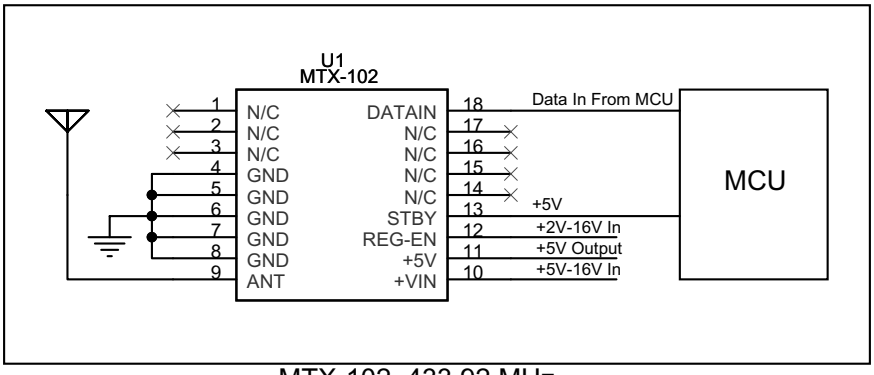
Pin Detail

Pin Number		Pin	
DIP	Surface Mount	Name	Description
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-102, 433.92 MHz

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Electrical Limits

Sym	Parameters	Min	Typ	Max	Unit	Notes
	Absolute Maximum Ratings					
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_{EN}	Enable Input Voltage	0		16	V	
	Operating Ratings					
	Maximum Supply Ripple Voltage			10	mV	
	PC Input Range	150		350	mV	
V_{EN}	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
Power Supply					
Operating Current	433.92 MHz		13		mA
Mean Operating Current, Note 4	33% mark/space ratio at 315MHz		4.7		mA
	33% mark/space ratio at 433MHz		6.7		mA
Standby supply current			0.04		µA
MARK supply current	@315MHz, Note 4		6	10.5	mA
	@433MHz, Note 4		8	12	mA
SPACE supply current	@315MHz		4	6	mA
	@433MHz		6	8.5	mA
Quiescent Current	REG-EN </= 0.4V (shutdown)		0.01		µA
Operating Voltage	Regulated	5		16	V
	Not Regulated	4.75		5.5	V
RF Output Section and Modulation Limits					
Output power level	@315MHz, Note 4		TBD		dBm
	@433MHz, Note 4		TBD		dBm
Transmit Frequency Range		300		470	MHz
Harmonics output	@315MHz 2nd harm.		-46		dBc
	3rd harm.		-45		dBc
	@433MHz 2nd harm.		-50		dBc
	3rd harm.		-41		dBc
Extinction ratio for ASK		40	52		dBc

Electrical Characteristics - CONT.

Digital Section					
Calibration time	Note 5, ASK=HIGH		25		ms
Power amplifier output hold off time from STBY	Note 6, STDBY transition from LOW to HIGH Crystal, ESR < 20ohms		6		ms
Transmitter Stabilization Time from STBY	From External Reference (500mVpp) Crystal, ESR < 20ohms		10 19		ms ms
Maximum Data Rate	Duty cycle of modulating signal=50%	20			kbits/s
ASK pin	Input high voltage Input low voltage	0.75VCC	0.6VCC 0.3VCC	 0.25VCC	V V
ASK input current	ASK = 0V, 5.0V input current	-10	0.1	10	µA
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. Supply current and output power are a function of the voltage input on the PC (power control) pin. All specifications in the Electrical Characteristics table applies for condition VPC = 350mV. Increasing the voltage on the PC pin will increase transmit power and also increase MARK supply current. Refer to the graphs "Output Power Versus PC Pin Voltage" and "Mark Current Versus PC Pin Voltage."

Note 5. When the device is first powered up or it loses power momentarily, it goes into the calibration mode to tune up the transmit antenna.

Note 6. 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.

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. 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

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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Editorial Information:

	(Date)
Last Updated	November 9, 2007 PRELIMINARY

Product Ordering Information:

MTX-102 - 433 D 4800 R A -B

Packaging:	B - Bulk TB - Tube TR - Tape and Reel
Antenna:	A - Antenna - No Antenna
Voltage Regulation:	R - Regulated - Not Regulated
Baud Rate:	600 = 600 bps = 1200 bps 2400 = 2400 bps 4800 = 4800 bps 9600 = 9600 bps 14400 = 14,400 bps
Footprint:	D - Through-hole S - Surface Mount SC - Surface Mount Capped
Frequency: (based on module's frequency range)	310 = 310 MHz 315 = 315 MHz 390 = 390 MHz 418 = 418 MHz 433 = 433.92 MHz XXX = Custom Frequency