RADIO MODULE
MRX-MT04/09

FSK/FM/ASK RECEIVER MODULE

Supports the follow parts:

MRX-MT04
MRX-MT09

PRELIMINARY

DATA SHEET

Radios, Inc.

May 5, 2006 Preliminary Data Sheet

MRX-MT04/09

FSK/FM/ASK RECEIVER MODULE

The MRX-MT04/09 is an ASK/FSK/FM receiver covering the frequency ranges of 300-450 MHz and 800-930 MHz with a single conversion superheterodyne architecture.

The MRX-MT04/09 consists of a low-noise amplifier, mixer, phase-frequency detector, charge pump, high-frequency voltage controlled oscillator, fixed feedback divider, and fully integrated phase-locked loop frequency synthesizer.
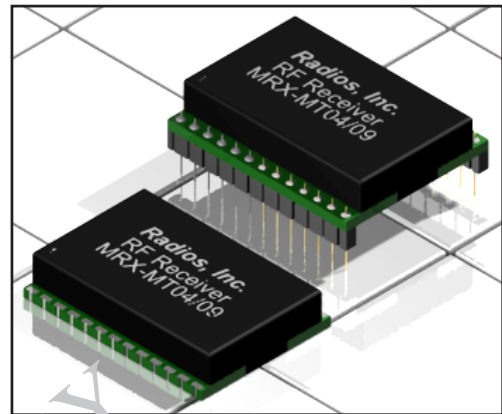
Key Features

- Single conversion superheterodyne architecture
- Frequency range from 300-450MHz or 800-930MHz
- ASK data rate: 0-80 kbps
- FSK data rate: 0-40 kbps by crystal pulling
- VCO phase locked to quartz crystal reference; allows narrow receiver bandwidth to maximize range and interference immunity
- Received Signal Strength Indicator (RSSI) for signal strength indication (FM, FSK) and ASK demodulation
- Low power consumption
  - 8.2 mA MRX-MT04
  - 9.2 mA MRX-MT09
- Wide operating voltage range: 2.7 - 16V
- FSK/FM quadrature detector demodulator

Typical Applications

- Remote keyless entry (RKE)
- Low power telemetry
- Wireless remote command and control
- Wireless security systems
- Low power FM receiver
- Home automation
- Remote sensing

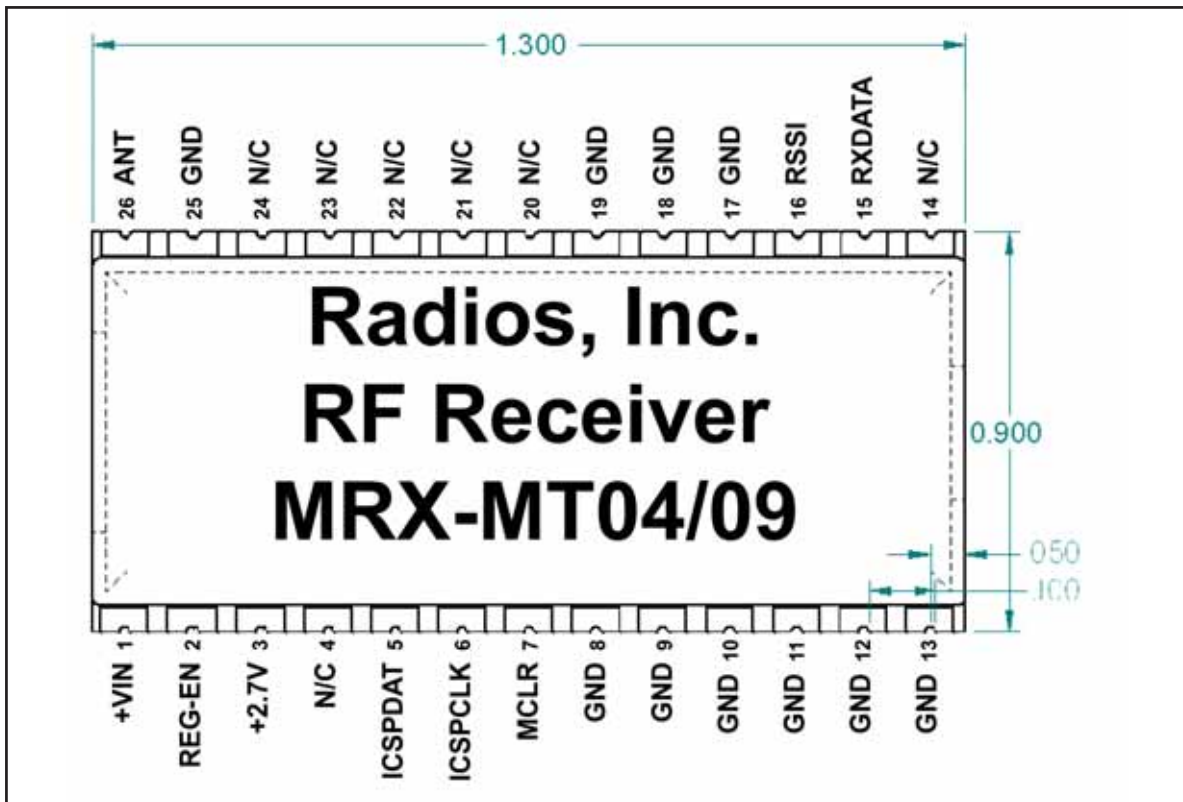| PRODUCT ORDER INFORMATION	
Part Number	Description
MRX-MT04(D)(S)	rfRXD0420 FSK/FM/ASK Module Receiver
MRX-MT09(D)(S)	rfRXD0920 FSK/FM/ASK Module Receiver

Contact Information	
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Mechanical and Pin Diagram

Pin Description

Pin Num	Pin Name	Description	Pin Num	Pin Name	Description
Pin 1	+VIN	Supply Voltage	Pin 14	N/C	No Connect
Pin 2	REG-EN	Regulator Enable	Pin 15	RXDATA	Received Data Output
Pin 3	+2.7V	Regulated Output	Pin 16	RSSI	RSSI Output
Pin 4	N/C	No Connect	Pin 17	Gnd	Ground
Pin 5	ISCPDAT	Serial Programming Data I/O	Pin 18	Gnd	Ground
Pin 6	ICSPCLK	Serial Programming Clock	Pin 19	Gnd	Ground
Pin 7	MCLR	Master Clear Reset	Pin 20	N/C	No Connect
Pin 8	Gnd	Ground	Pin 21	N/C	No Connect
Pin 9	Gnd	Ground	Pin 22	N/C	No Connect
Pin 10	Gnd	Ground	Pin 23	N/C	No Connect
Pin 11	Gnd	Ground	Pin 24	N/C	No Connect
Pin 12	Gnd	Ground	Pin 25	Gnd	Ground
Pin 13	Gnd	Ground	Pin 26	ANT	RF Input

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Electrical Limits

Sym	Parameters	Min	Typ	Max	Unit	Notes
	Absolute Maximum Ratings					
VDD	Supply Voltage	-20		20	V	
	Storage Temperature Range	-40		125	°C	
	Lead Temperature		260		°C	
V_{EN}	Enable Input Voltage	-20		+20	V	
	Operating Ratings					
	Supply Voltage	2.7		16	V	
V_{EN}	Enable Input Voltage	0		TBD	V	
TA	Ambient operating temperature	-40		85	°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
DC Characteristics					
Supply Current	MRX-MT04	6.5	8.2	10.0	mA
	MRX-MT09	7.5	9.2	11.0	mA
RSSI Voltage		1.25	1.9	2.45	V
AC Characteristics					
Transmit Frequency	MRX-MT04	300		450	MHz
	MRX-MT09	800		930	MHz
ASK Data Rate	NRZ			80	kbps
FSK Data Rate	NRZ			40	kbps
IF Frequency		0.455		21.4	MHz
Start-up time - FSK/FM				0.9	mS
Sensitivity - MRX-MT04	Narrowband FSK, Note 4		-111		dBm
	Wideband FSK, Note 5		-104		dBm
	Narrowband ASK, Note 6		-109		dBm
	Wideband ASK, Note 7		-106		dBm
Sensitivity - MRX-MT09	Narrowband FSK, Note 4		-109		dBm
	Wideband FSK, Note 5		-102		dBm
	Narrowband ASK, Note 6		-108		dBm
	Wideband ASK, Note 7		-104		dBm

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Electrical Characteristics - CONT.

ENABLE Input					
Enable Input Logic-Low Voltage(V_{IL})	regulator shutdown			0.4	V
Enable Input Logic-High Voltage(V_{IH})	regulator enabled	2.0			V
Enable Input Current	$V_{IL} <= 0.4V$		0.01	-1	µA
	$V_{IL} <= 0.18V$			-2	µA
	$V_{IH} = 2.0V$	2	5	20	µA
	$V_{IH} = 2.0V$			25	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. IF bandwidth = 40 kHz, $\Delta f = \pm 15$ kHz, BER <= 3×10^{-3}

Note 5. IF bandwidth = 150 kHz, $\Delta f = \pm 50$ kHz, BER <= 3×10^{-3}

Note 6. IF bandwidth = 40 kHz, BER <= 3×10^{-3}

Note 7. IF bandwidth = 150 kHz, BER <= 3×10^{-3}

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Technical Support:

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Editorial Information:

	(Date)
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