

*RADIO MODULE*  
**MXR-NT905/06/10/11**

**FM TRANSCEIVER MODULE**

**Supports the follow parts:**

MXR-NT905  
MXR-NT906  
MXR-NT910  
MXR-NT911

PRELIMINARY

**DATA SHEET**

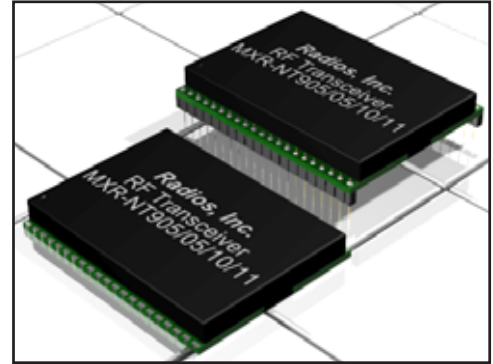
***Radios, Inc.***

April 27, 2006 Preliminary Data Sheet

# MXR-NT905/06/10/11

## FM TRANSCEIVER MODULE

The MXR-NT905/06/10/11 is a complete FM or FSK transceiver which will operate in any 26 MHz band from 100-1000 MHz, including the Industrial Scientific Medical (ISM) band (902-928 MHz). Utilizing a unique direct-conversion, zero-intermediate frequency (zero-IF) receiver architecture, the MXR-NT905/06/10/11 provides a simplified and more reliable RF solution. The receiver section has all the required RF synthesis, down-conversion, filtering, automatic gain control (AGC), automatic frequency control (AFC), and demodulator functions. The transmitter section contains a directly modulated VCO and RF power amplifier (PA). Internal, dual, high-performance phase locked loop (PLL) synthesizers with VCOs allow full-duplex Tx or Rx operation over the entire RF tuning range.



MXR-NT905/06/10/11 provides a high level of integration, with high performance operation and low power consumption. The MXR-NT905/06/10/11 operates over an industrial temperature range of -20C to +65C and over the supply voltage range of 2.7 to 3.3 VDC.

The receive section consists of several major functional blocks, including a switchable RF input attenuator, quadrature mixer (down-conversion), differential to single-ended convertor, variable gain amplifiers (VGAs), PLL synthesizer with voltage controlled oscillator (VCO), I/Q low-pass filters, DC offset correction circuit, quadrature mixer (upconversion), zero-crossing detector, Period-to-Digital converter (P/D), Linearization ROM, and a Digital-to-Analog converter (DAC). Additionally, it contains a reference crystal oscillator with automatic frequency control (AFC) circuit and associated reference frequency synthesizer. The transmit section consists of a PLL synthesizer with a directly modulated voltage controlled oscillator (VCO), and a RF power amplifier (PA).

### Key Features

- 100 - 1000 MHz Frequency Range
- Direct-Conversion, Zero-IF, Architecture
- Full or Half-Duplex Operation
- Suitable for FM or FSK Modulation
- 3-wire Serial Interface
- 2.7 - 16 VDC Supply Voltage
- No Tune "Tankless" Detector
- RF Output +3.0 dBm
- Low Cost

### Typical Applications

- Analog and Digital 900 MHz Cordless Phones
- AMR/Telemetry/Data Radios
- Wireless Security Products
- ISM Band (868, 915 MHz) Wireless Voice and Data Products

### PRODUCT ORDER INFORMATION

Part Number	Description
MXR-NT905(D)(S)	NT2905 900 MHz FM Module Transceiver
MXR-NT906(D)(S)	NT2906 900 MHz FM Module Transceiver
MXR-NT910(D)(S)	NT2910 900 MHz FM Module Transceiver
MXR-NT911(D)(S)	NT2911 900 MHz FM Module Transceiver

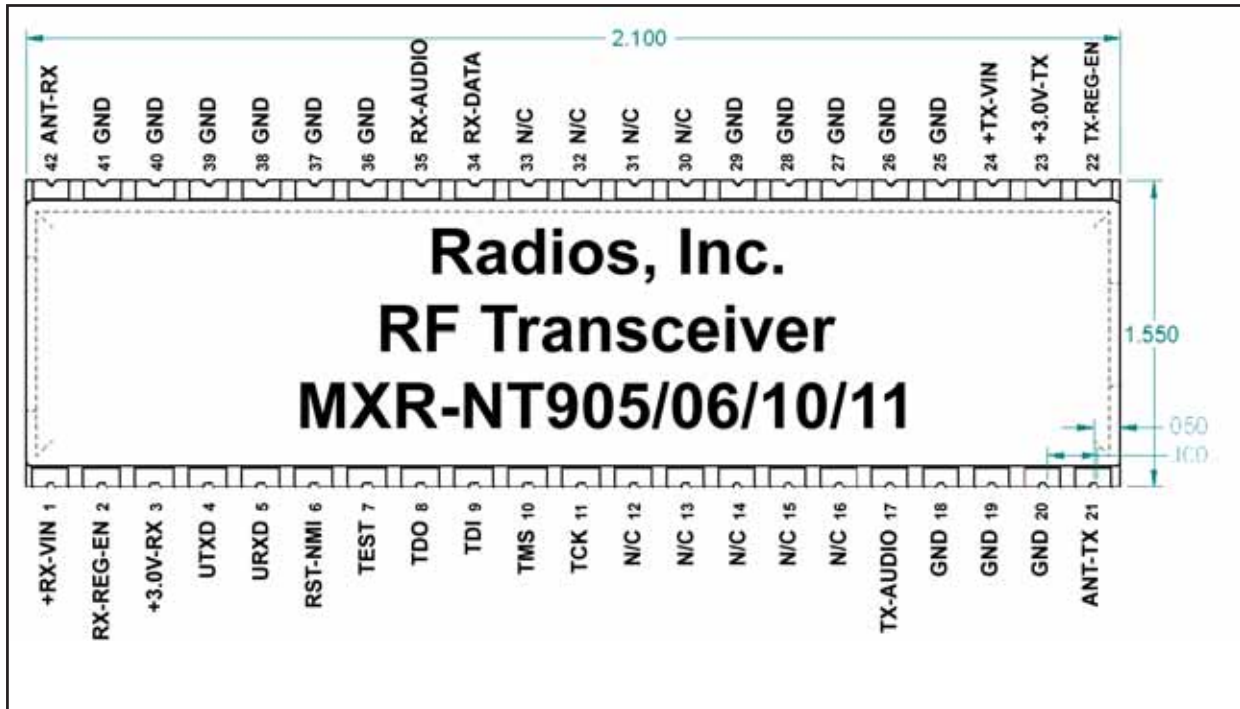
### Contact Information

Radios, Inc. P.O. Box 1304 North Wales, PA 19454	Phone: 215-362-1899 Fax: 215-362-2214 Email: sales@radiosinc.com
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## FM TRANSCEIVER MODULE

### Mechanical and Pin Diagram



### Pin Description

Pin Num	Pin Name	Description	Pin Num	Pin Name	Description
Pin 1	+RX-VIN	Positive Supply Pin - Receiver	Pin 22	TX-REG-EN	Regulator Enable - Transmitter
Pin 2	RX-REG-EN	Regulator Enable - Receiver	Pin 23	+3.0V-TX	Regulated Output - Transmitter
Pin 3	+3.0V-RX	Regulated Output - Receiver	Pin 24	+TX-VIN	Positive Supply Pin - Transmitter
Pin 4	UTXD	UART Transmit Data Out	Pin 25	Gnd	Ground
Pin 5	URXD	UART Receive Data In	Pin 26	Gnd	Ground
Pin 6	RST/NMI	Reset/Nonmaskable Interrupt Input	Pin 27	Gnd	Ground
Pin 7	TEST	Selects Test Mod	Pin 28	Gnd	Ground
Pin 8	TDO	Test Data Output	Pin 29	Gnd	Ground
Pin 9	TDI	Test Data Input	Pin 30	N/C	No Connect
Pin 10	TMS	Test Mode Select	Pin 31	N/C	No Connect
Pin 11	TCK	Test Clock	Pin 32	N/C	No Connect
Pin 12	N/C	No Connect	Pin 33	N/C	No Connect
Pin 13	N/C	No Connect	Pin 34	RX-DATA	Receive Data Output
Pin 14	N/C	No Connect	Pin 35	RX-AUDIO	Receive Audio Output
Pin 15	N/C	No Connect	Pin 36	Gnd	Ground
Pin 16	N/C	No Connect	Pin 37	Gnd	Ground
Pin 17	TX-AUDIO	Transmitter Audio and Data Input	Pin 38	Gnd	Ground
Pin 18	Gnd	Ground	Pin 39	Gnd	Ground
Pin 19	Gnd	Ground	Pin 40	Gnd	Ground
Pin 20	Gnd	Ground	Pin 41	Gnd	Ground
Pin 21	ANT-TX	RF Output	Pin 42	ANT-RX	RF Input

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## FM TRANSCEIVER MODULE

### Electrical Limits

Sym	Parameters	Min	Typ	Max	Unit	Notes
<b>Absolute Maximum Ratings</b>						
VDD	Supply Voltage	2.7		16	V	
	Storage Temperature Range	-65		150	°C	
	Lead Temperature		260		°C	
V <sub>EN</sub>	Enable Input Voltage	-20		+20	V	
<b>Operating Ratings</b>						
	Maximum Supply Ripple Voltage			TBD	mV	
V <sub>EN</sub>	Enable Input Voltage	0		IBD	V	
TA	Ambient operating temperature	-20		65	°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>General Characteristics</b>					
Frequency of Operation		100		1000	MHz
Reference Frequency		5		20	MHz
Serial Interface Clock Frequency		0.1		20	MHz
Supply Current	Receive Only Transmit Only Total (RX + TX)		34 20 50		60 mA mA mA
Standby Current				5	µA
Quiescent Current	V <sub>EN</sub> </= 0.4V (shutdown) V <sub>EN</sub> </= 0.18V (shutdown)		0.01	1 5	µA µA
<b>Receiver Characteristics</b>					
Input Sensitivity	12dB SINAD, Note 4 10 <sup>-3</sup> BER, Note 5	-102 -91	-104 -94	-106 -97	dBm dBm
Noise Figure			TBD		dB
Input IP <sub>3</sub>	Note 6, 7		-1		dBm
Receiver Channel Bandwidth	Note 7 NT911 Only	16 19		130 130	kHz kHz
RSSI Voltage Range	-100 to -35dBm, Note 6	0.1		2.1	VDC
RSSI Conversion Factor	Log	-27	-32	-37	mV/dB
Audio Response	HP Cutoff (-3dB) LP Cutoff (-3dB) LP Cutoff (-3dB), NT911 Only		50 70	0.15	kHz kHz kHz
Channel Spacing		6.25			kHz
Channel Step Size		6.25			kHz

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### Electrical Characteristics - CONT.

Transmitter Characteristics					
Transmitter Output Power		0	3	5	dBm
Channel Spacing		6.25			kHz
Channel Step Size		6.25			kHz
ENABLE Input					
Enable Input Logic-Low Voltage( $V_{IL}$ )	regulator shutdown			0.4 0.18	V V
Enable Input Logic-High Voltage( $V_{IH}$ )	regulator enabled	2.0			V
Enable Input Current	$V_{IL} \leq 0.4V$ $V_{IL} \leq 0.18V$ $V_{IH} = 2.0V$ $V_{IH} = 2.0V$	2	0.01 5	-1 -2 20 25	$\mu A$ $\mu A$ $\mu A$ $\mu A$

**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.** CCITT receive audio filter. Sensitivity increases slightly with decreasing receiver channel bandwidth (not inversely proportional).

**Note 5.** 56.7kbps 511 PRBS, FSK modulation, 80kHz low pass receive filter. Sensitivity increases slightly with decreasing receiver channel bandwidth (not inversely proportional).

**Note 6.** For maximum receiver gain (increases as the receiver gain is reduced).

**Note 7.** Some restrictions on the combination of receiver bandwidth and receive frequency band.

## **MXR-NT905/06/10/11**

### **FM TRANSCEIVER MODULE**

#### **Product Warranty and Disclaimer Information:**

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### **FM TRANSCEIVER MODULE**

#### **Technical Support:**

Radios Inc. is committed to providing its customers with excellent technical support and the resources necessary to assist its customers with their product development. 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 may call Radios Inc. at 215-362-1899.

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	(Date)
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