ROSA MWAVE SOLUTIONS

Product Brief

81-86 GHz Receiver Module

RxM83WR12

General Description

The *RxM83WR12* was developed to satisfy the receiver requirements of a complex (I/Q) modulation, micro-controller-based, Gigabit E-Band radio terminal.

A single *RxM83WR12* receiver module, teamed with a single *TxM83WR12* transmitter module and appropriate antennas, can serve as the complete RF section of a low-power Gigabit simplex radio.

A full-duplex FDD radio operating in the 71-76/81-86 GHz bands can be realized by using one *RxM73WR12* Rx module, one *RxM83WR12* Rx module, one *TxM73WR12* Tx module, and one *TxM83WR12* Tx module with appropriate duplexers and antennas *(see Figure 2).*

For maximum operating range, an ultra low noise preamplifier can be easily attached to the *RxM83WR12* input interface (WR-12 with UG-387/U-compatible flange).

Key operational parameters are programmed via a 4-wire Serial Peripheral Interface (SPI).

Features

- Direct down-conversion from 81-86 GHz
- Supports up to 3 Gbps, full-duplex data rate
- Supports 1 GHz channel spacing for QPSK to 128 QAM typ.
- Noise Figure (DSB): 11 dB typ.
- Input P-1dB: -12 dBm typ.
- Differential I/Q outputs
- SPI interface controls Rx on/off and temperature sensor output
- Low phase noise, internal VCO Local Oscillator
  - VCO tune input and divided-down output for connecting to external PLL circuitry
  - SSB phase noise (typ.):
    - -83 dBc/Hz @ 100 KHz offset
    - -105 dBc/Hz @ 1 MHz offset
    - -125 dBc/Hz @ 10 MHz offset
- Single voltage DC Bias: +6V @ 0.5A typ.

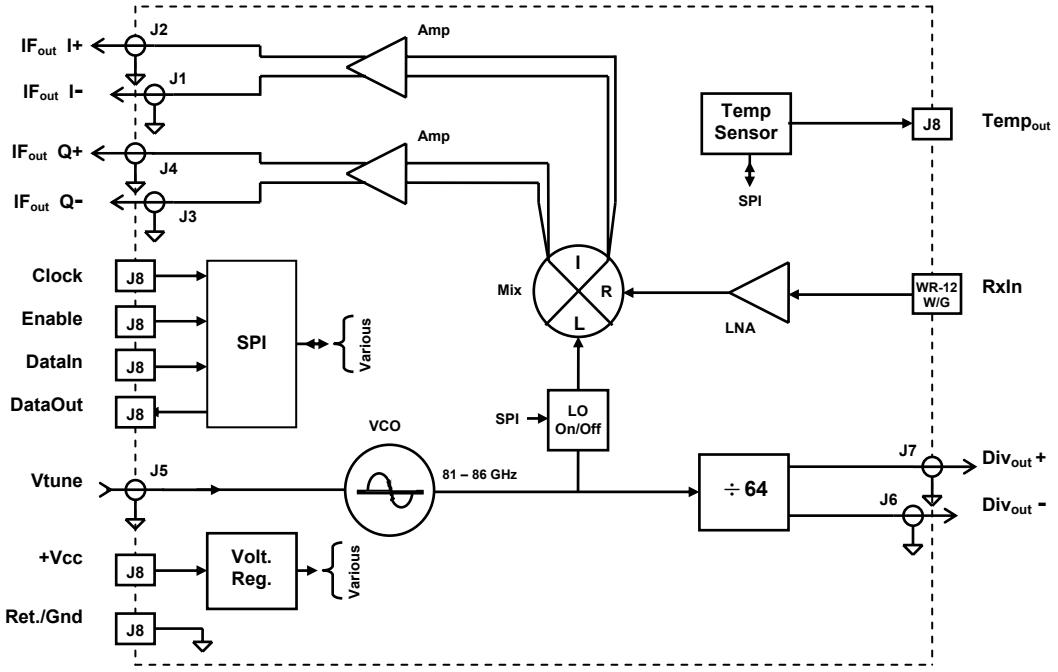

Figure 1 – RxM83WR12 Functional Block Diagram

Functional Characteristics		
Mnemonic	**Conn.**	**Description**
+Vcc	J8	DC bias input requirement: 6.0 ± 5% VDC @ 0.5A typ.
Vtune	J5	VCO tune voltage for 81-86 GHz output = 0.6 to 3.8V typ.
DataOut	J8	SPI data sequence from Receiver; CMOS/TTL compatible
DataIn	J8	SPI data sequence to Receiver; CMOS/TTL compatible
Enable	J8	SPI On/Off control signal to Receiver; CMOS/TTL compatible
Clock	J8	SPI clock to Receiver; CMOS/TTL compatible
IFout Q-	J3	Differential Quadrature-phase outputs; impedance: 100Ω differential (50Ω single-ended); bandwidth (each channel) = 500 MHz min./1 GHz typ., AC-coupled
IFout Q+	J4	
IFout I-	J1	Differential In-phase outputs; impedance: 100Ω differential (50Ω single-ended); bandwidth (each channel) = 500 MHz min./1 GHz typ., AC-coupled
IFout I+	J2	
TempOut	J8	Temperature sensor output (DC voltage)
RxIn	W/G	Receiver input: WR-12 with UG-387/U compatible flange; -61 dBm typ. LO residual power at Rx input
Divout+	J7	Frequency ≈ 1.27 GHz to 1.34 GHz; impedance: 100Ω differential (50Ω single-ended); output (typ.) = -9 dBm differential (-12 dBm single-ended)
Divout-	J6	
Operating temperature range = -35 to 65 deg. C		
Storage temperature range = -40 to 75 deg. C		

Note – Differential signaling provides several performance improvements vs. single-ended signaling, including reduced radiated noise pickup, reduced 2nd order distortion products, and doubled signal amplitudes. A/D converters (which the I/Q outputs ultimately drive in the Digital Signal Processor), generally utilize differential inputs.

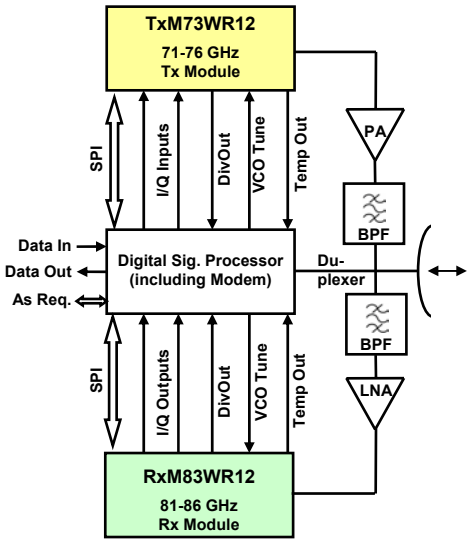

Figure 2 – Full-Duplex E-Band Radio Terminal Baseline Design

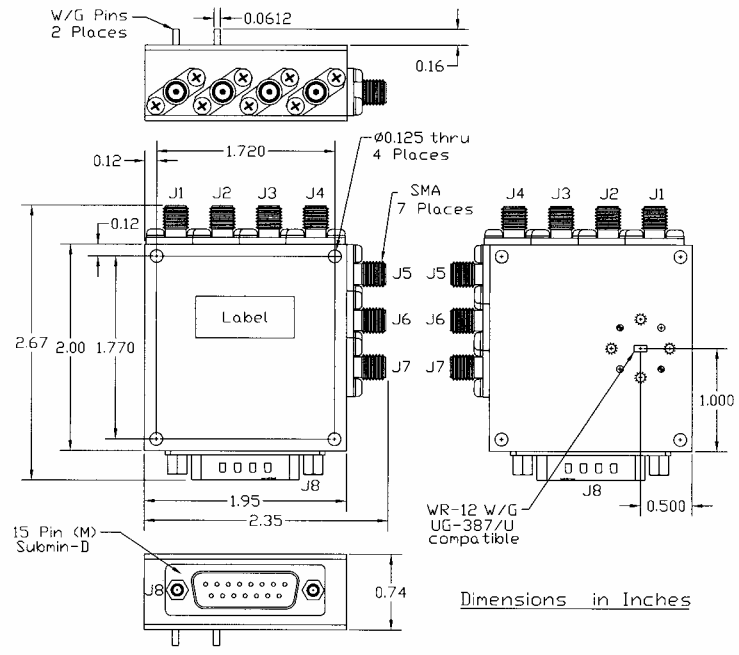

Figure 3 – RxM83WR12 Outline