

General Description

The TxM73WR12 was developed to satisfy the transmitter requirements of a complex (I/Q) modulation, micro-controller-based, Gigabit E-Band radio terminal.

A single TxM73WR12 transmitter module, teamed with a single RxM73WR12 receiver 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 bands can be realized by using one TxM73WR12 Tx module, one TxM83WR12 Tx module, one RxM73WR12 Rx module, and one RxM83WR12 Rx module with appropriate duplexers and antennas (see Figure 2).

For maximum operating range, a high power MMW amplifier can be easily attached to the TxM73WR12 output interface (WR-12 with UG-387/U-compatible flange).

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

Features

- Direct up-conversion to 71-76 GHz: 50 dB typ. LO suppression after calibration
- Differential I/Q inputs: support image rejection of 50 dB typ. with correction via the SPI (vs. 30 dB typ. without correction)
- SPI controls Tx On/Off, Tx output power adjust, selection of either output power or modulation envelope detected output, and temperature sensor output
- Tx output power (set to max.): 10 dBm (typ.)
- Low phase noise, internal VCO Local Oscillator
 - VCO tune input and divided-down output for connecting to external PLL circuitry
 - SSB phase noise (typ.):
 - -84 dBc/Hz @ 100 KHz offset
 - -105 dBc/Hz @ 1 MHz offset
 - -125 dBc/Hz @ 10 MHz offset
- Single voltage Bias: +6VDC @ 0.6A (typ.)

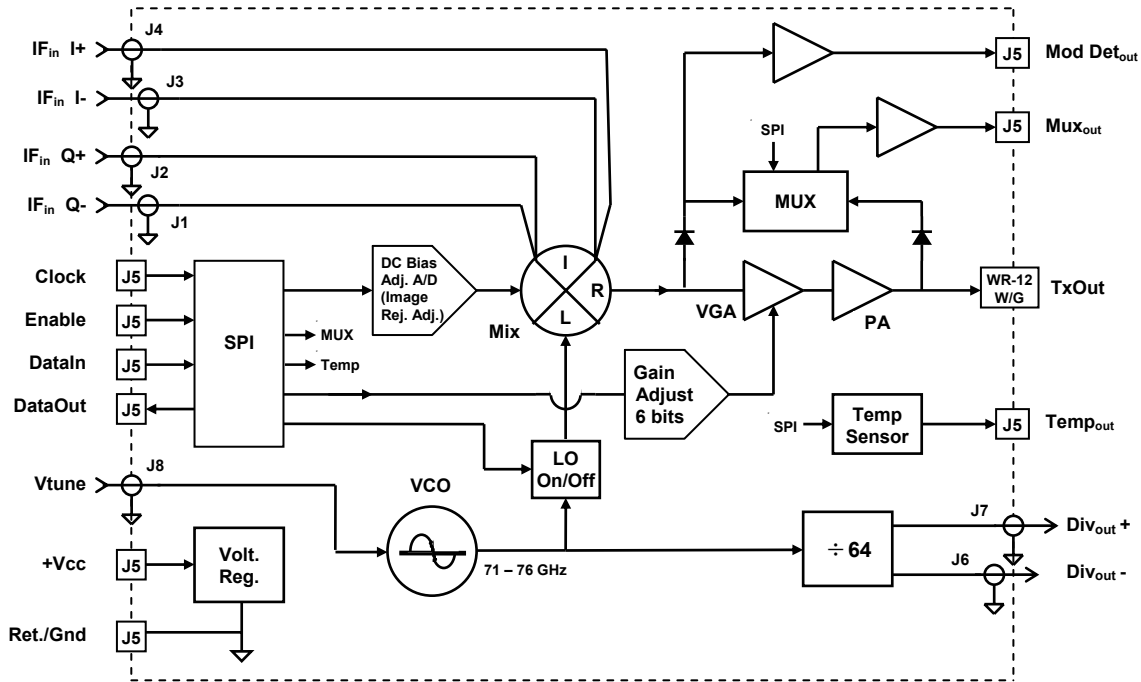


Figure 1 – TxM73WR12 Functional Block Diagram

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Functional Characteristics		
Mnemonic	Conn.	Description
+Vcc	J5	DC bias input requirement: 6.0 VDC \pm 5% @ 0.6A typ.
Vtune	J8	VCO tune voltage for 71-76 GHz output = 0.5 to 4.0V typ.
DataOut	J5	SPI data sequence from Transmitter; CMOS/TTL compatible
DataIn	J5	SPI data sequence to Transmitter; CMOS/TTL compatible
Enable	J5	SPI On/Off control signal to Transmitter; CMOS/TTL compatible
Clock	J5	SPI clock to Transmitter; CMOS/TTL compatible
IFin Q-	J1	Differential Quadrature-phase inputs; impedance: 100 Ω differential (50 Ω single-ended); bandwidth (each channel) = 500 MHz min./1 GHz typ. (AC-coupled).
IFin Q+	J2	
IFin I-	J3	Differential In-phase inputs; impedance: 100 Ω differential (50 Ω single-ended); bandwidth (each channel) = 500 MHz min./1 GHz typ. (AC-coupled).
IFin I+	J4	
Mod Detout	J5	Wideband envelope tracking detection
Muxout	J5	Narrow- or Wide-band detection (selectable via SPI); 20 dB range, 2 dB accuracy (typ.)
TxOut	W/G	From 71-76 GHz, with output power set to max. (via SPI): P-1dB = 10 dBm typ.; LO suppression >50 dB typ. achievable using SPI controllable adjustments plus <i>micro-controller executed calibration routine (not included with Tx Module)</i> ; 15 dB typ. output power control (via. SPI); WR-12 waveguide with UG387/U compatible flange
Tempout	J5	Temperature sensor output (DC voltage)
DivOut +	J7	Frequency \approx 1.11 GHz to 1.19 GHz; impedance: 100 Ω differential (50 Ω 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.

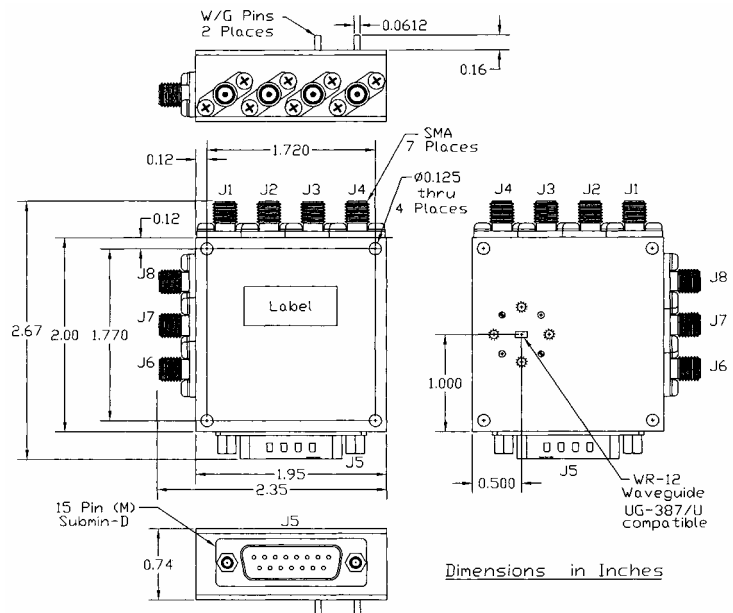
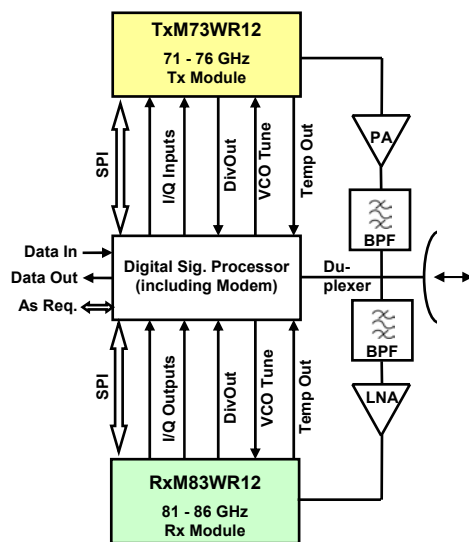


Figure 2 - Full-Duplex E-Band Radio Terminal Baseline Design

Figure 3 – TxM73WR12 Outline