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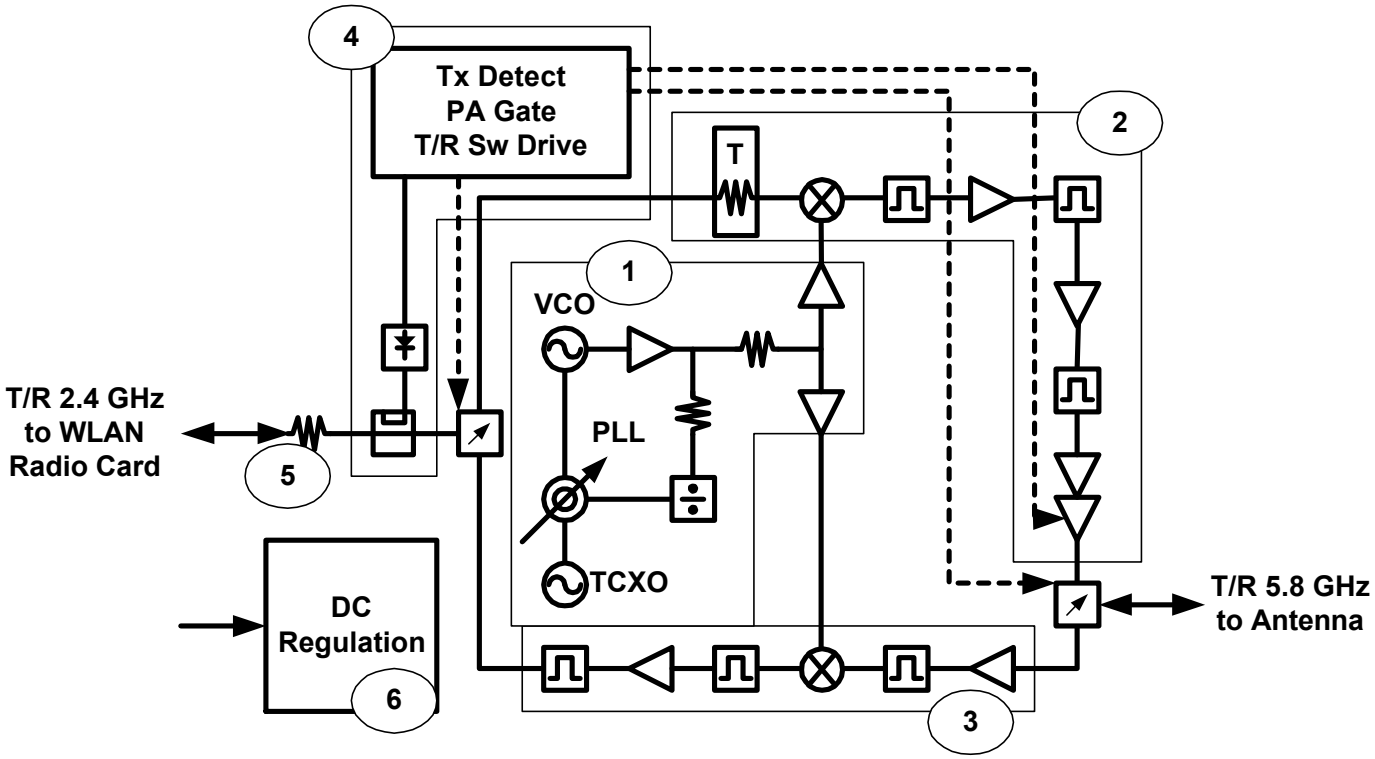
2.4 to 5.8 GHz Up/Down Converter Module Block Level Schematic

Malibu Networks Part Number 2110501-000

Used on Malibu Networks AirMax 580-B and AirMAX 5800-B
Supplier: Teletronics
Supplier Part Number: UDC 5800



Block Level Schematic Functional Description

1 Overview Functional Description: The 2.4 to 5.8 Up/Down Converter (UDC) is utilized in Malibu Networks' AirMax 580 and 5800 model products. The UDC is supplied as a module by Teletronics, Inc. to Malibu Networks, Inc. The UDC's primary functions are:

- 1.1 Block frequency upconvert and amplify 2.4 GHz 802.11b modulated carriers sourced from a WLAN card to the 5.8 GHz U-NII Band for transmission over-the-air
- 1.2 Block frequency downconvert and amplify 5.8 GHz the modulated carriers received over-the-air in the 5.8 GHz U-NII Band to a 2.4 GHz WLAN card.

2 Detailed Functional Description (Please Refer to accompanying block schematic diagram)

- 2.1 Circuit Group (1) – Phased Locked Loop Voltage Controlled Local Oscillator and Local Oscillator Distribution
  - 2.1.1 VCO is sampled, divided and phase comparison performed to derive VCO tune voltage proportional to frequency error difference of VCO and TCXO. TCXO is specified such that the Local Oscillator Frequency (and consequent up and downconverted carrier frequencies) is held to within +/- 2 PPM over the product operating temperature range. The PLLVCO is fixed frequency type at 3.328 GHz and not tuned.
  - 2.1.2 The PLLVCO output is buffered, split and amplified to drive the mixers in the transmit block (2) and receive block (3).
- 2.2 Circuit Group (2) – Upconverter
  - 2.2.1 2.4 GHz modulated carriers arrive at the input to the Upconverter on the left side of the diagram. When a carrier is present at this interface, the UDC is automatically placed in transmit mode by block (4), described more in detail later in this document.
  - 2.2.2 The incoming 2.4 GHz carriers are mixed with the 3.328 GHz LO and the 5.8 GHz product is selected by filtering.
  - 2.2.3 The Upconverted signal is amplified to achieve the required transmitter output power.
  - 2.2.4 The Transmitter gain is temperature compensated
  - 2.2.5 No power control is performed on the UDC. Power control is achieved via controls to the WLAN radio.
  - 2.2.6 Upconverted carriers are directed to the antenna by the T/R switch at the right side of the diagram.
- 2.3 Circuit Group (3) - Downconverter
  - 2.3.1 5.8 GHz carriers arrive at the antenna interface on the right side of the diagram.
  - 2.3.2 The received 5.8 GHz carriers are directed to the downconverter by the T/R switch.
  - 2.3.3 The received carriers are amplified, filtered and mixed with the LO of 3.328 GHz and further filtered to select the desired 2.4 GHz product.
  - 2.3.4 The received carriers are directed to the WLAN radio via the T/R switch at the left side of the diagram.
- 2.4 Circuit Group (4) – Transmit Detection and Driver
  - 2.4.1 When 2.4 GHz carriers are presented to the UDC from the WLAN card, they are sampled, detected, amplified and compared to a reference voltage.
  - 2.4.2 In the presence of a 2.4 GHz carrier presented to the UDC, the transmit detector drives both T/R switches to direct the signal through the transmitter (2) and on to the antenna interface.
  - 2.4.3 The transmit detector also gates the final PA stage "on" (transmit mode) when the 2.4 GHz carrier from the radio card is present and "off" (receive mode) when there is no carrier presented by the radio card.
- 2.5 Circuit Group (5) – Coarse Transmit Power Set Attenuator
  - 2.5.1 This attenuator is factory selected to during final test to set the transmit output power matching the nominal radio output power and gain of the transmitter to achieve the desired transmit power.
  - 2.5.2 Fine channel-to-channel power flatness is further calibrated out during final test via software setting of the WLAN radio drive level.
- 2.6 Circuit Group (6) – DC Regulation – Provides local DC voltage regulation for all UDC functions.