CML Microcircuits
COMMUNICATION SEMICONDUCTORS

Product Preview

PP971/1 May 2012

CMX971
Quadrature Modulator
(RF Building Block)

Introduction

The CMX971 low power quadrature modulator adds to the growing range of RF Building Block ICs from CML.

Low power consumption, flexibility and high performance are key values of the RF Building Block products.

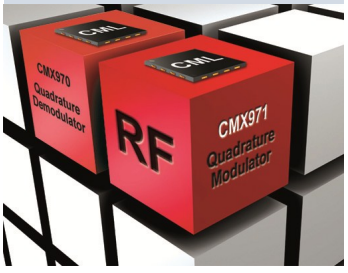
The CMX971 Quadrature Modulator offers very low power consumption and high performance over the operating range of 20MHz - 1GHz.

The wide 50MHz signal bandwidth at RF, 0dBm output, low noise and serial bus or direct control operation, deliver maximum flexibility and high performance all at an attractive low operating power.

Size is an important factor in many radio designs, the CMX971 addresses this with its availability in a very small, RF optimised 16-pin VQFN package (4mm x 4mm x 1mm).

Applications

- Wireless Data Terminals
- HF, VHF and UHF Mobile Radio
- Avionics Radio Systems
- High-performance professional radios
- Digital wireless microphones



CMX971 Brief Description

The CMX971 is a high performance quadrature modulator featuring a wide operating frequency range and attractive power consumption. Control of the CMX971 may be either by serial bus or by direct control (with reduced functionality). Programmable features include local oscillator divider ratio (2 or 4) and optimised operation for 3 frequency bands (low/ medium/high).

The small, RF-optimised VQFN package and minimal external components make the device ideal for space-constrained applications.

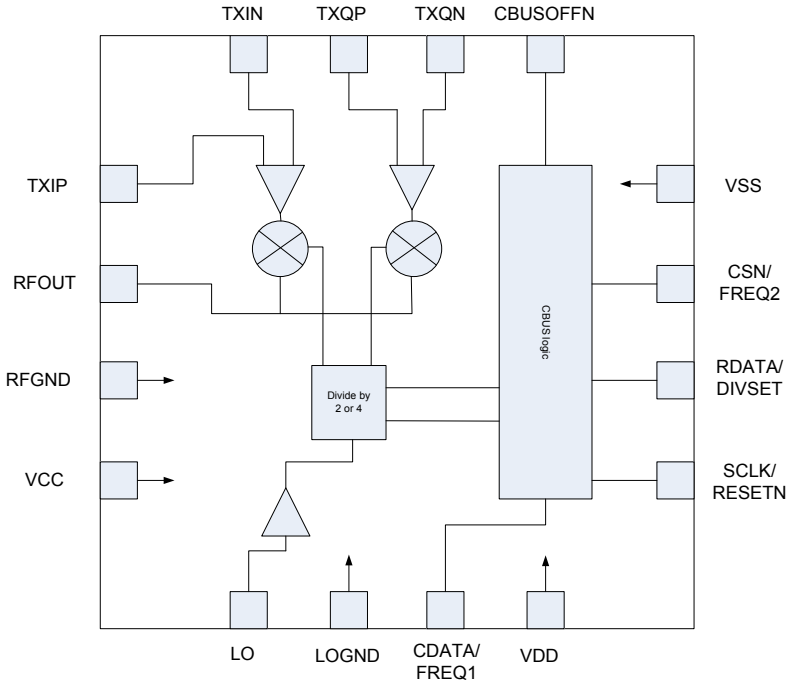
Features

- 20MHz - 1GHz MHz RF output
- 0dB output level
- 25MHz I/Q bandwidth
  (50MHz bandwidth at RF)
- Serial bus or direct control operation
- Variable gain and dc offset adjustment
- Low power 3.0V - 3.6V operation
- Small 16-pin VQFN package

Key Benefits

- Flexible RF Building Block solution
- Low power consumption
- High performance
- Flexibility
- Low noise
- Small VQFN packaging
- Direct control option for host-less operation
- Simple interfacing to existing modem/ baseband products

Small 16-pin VQFN



CMX971 Function Diagram

Quadrature Modulator

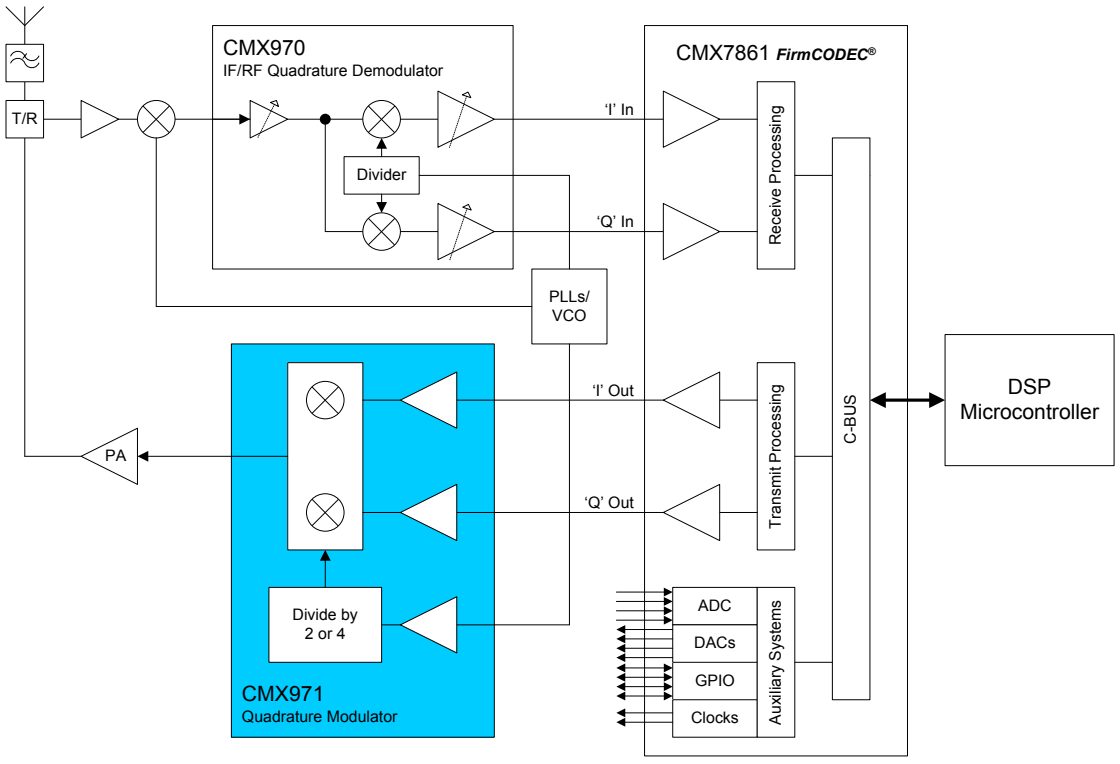
Quadrature (I/Q) modulation provides a number of advantages over conventional two-point modulation schemes

Two-point modulation requires calibration/adjustment to achieve optimum performance

I/Q modulation is the answer, providing maximum flexibility in the digital domain and allows coherent phase to be achieved

An I/Q quadrature modulator provides accurate phase modulation.

I/Q baseband signals are mixed up to RF by two double balanced mixers driven by the same frequency but separated in phase by 90 degrees. The outputs of the two mixers are then summed to provide the modulated output.



Typical system application utilising:

CMX971—Quadrature Modulator

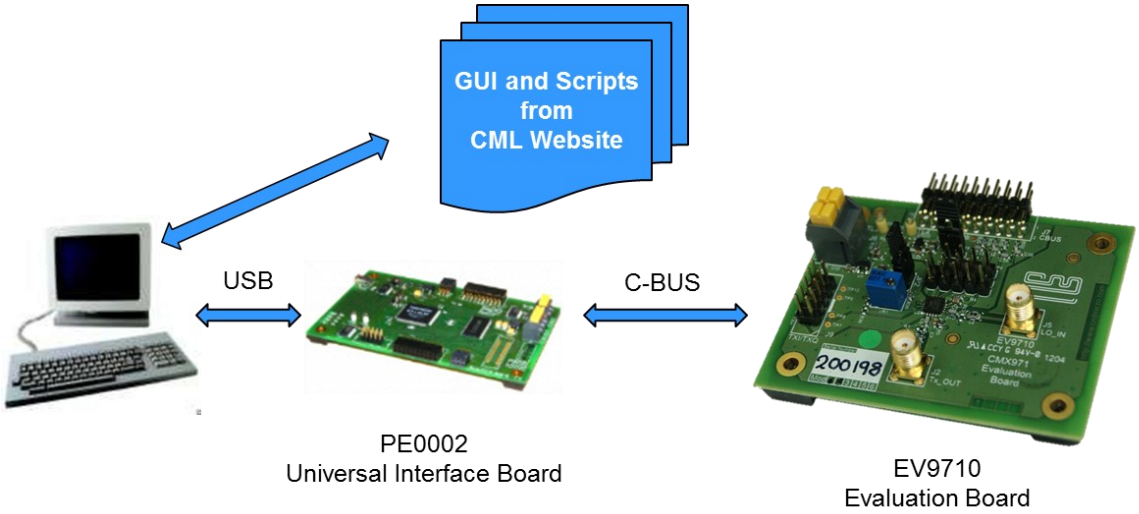
CMX970—IF/RF Quadrature Demodulator

CMX7861—Programmable Baseband Interface IC

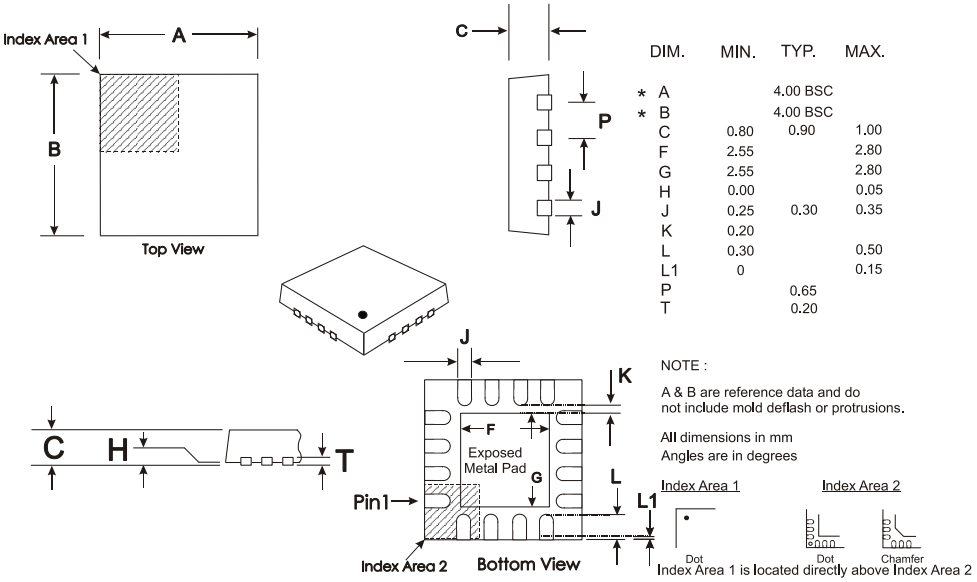
Evaluation Support

The EV9710 is an Evaluation Kit designed for evaluating and demonstrating the capabilities of the CMX971 integrated circuit. All the circuits necessary to demonstrate the facilities provided by the IC, such as matching circuits, power supply regulators, etc are provided on the EV9710 board.

A C-BUS interface connector is provided for control of the EV9710 by a host microcontroller or CML PE0002 interface card. The CMX971 can also be used in a 'direct control' mode, where a host or PE0002 is not required. Alternatively any microcontroller evaluation/emulator kit can be used to drive the CMX971/EV9710 serial bus.



Package



Depending on the method of lead termination at the edge of the package, pull back (L1) may be present.
L minus L1 to be equal to, or greater than 0.3mm
The underside of the package has an exposed metal pad which should ideally be soldered to the pcb to enhance the thermal conductivity and mechanical strength of the package fixing. Where advised, an electrical connection to this metal pad may also be required

Mechanical Outline of the 16-pin VQFN (Q7)

Order as part no. CMX971Q7

Electrical Specification Summary

Operating Limits	Min	Typ	Max	Unit
Supply Voltage:				
Digital Supply ($V_{DD} – V_{SS}$)	3.0	-	3.6	V
Analogue Supply ($V_{CC} – V_{RFGND}$)	3.0	-	3.6	V
Operating Temperature	-40	-	+85	°C
Local Oscillator Input	40	-	2000	MHz
Output Frequency Range	20	-	1000	MHz

DC Parameter - Supply Current	Min	Typ	Max	Unit
Total Current Consumption:				
Powersave mode	-	7	-	µA
Bias only	-	1.7	-	mA
Operating	-	63	-	mA

Quadrature Modulator	Min	Typ	Max	Unit
Performance Figures:				
Output Power (PEP)	-	0	-	dBm
Noise Floor	-	-150	-	dBm/Hz
Equivalent Output IP3	-	21	-	dBm

Comprehensive technical datasheet and support material is available from the CML website.

Click here to link to the CML website or search for: CMX971

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