CML Microcircuits
COMMUNICATION SEMICONDUCTORS

Product Preview

PP970/4 July 2012

CMX970

IF/RF Quadrature Demodulator

(RF Building Block)

Introduction

The CMX970 is the first of a new 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 CMX970 IF/RF Quadrature Demodulator offers very low power consumption and high-performance over the operating range of 20 - 300 MHz.

The wide 10MHz I/Q bandwidth, variable gain adjustment and serial bus or direct control operation, deliver a level of flexibility and previously unavailable features, at the heart of the product.

Size is an important factor in many radio designs, the CMX970 addresses this with its availability in a very small 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



CMX970 Brief Description

The CMX970 is a low power IF or RF quadrature demodulator featuring a wide operating frequency range and low power consumption. Suitable for architectures with IF or RF frequencies up to 300MHz, the device may be used in low IF systems or those converting down to baseband. Control of the CMX970 may be either by serial bus or direct control (with reduced flexibility).

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

Features

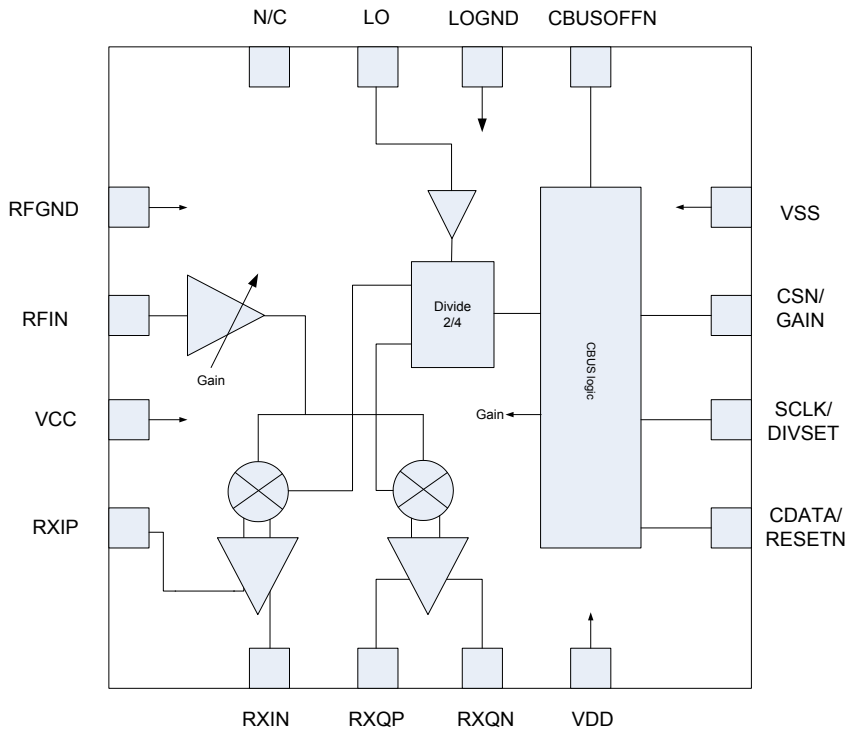
- 20-300 MHz IF/RF demodulator
- 10MHz I/Q bandwidth
- Serial bus or direct control operation
- Variable gain and dc offset adjustment
- Low power 3.0 - 3.6 V operation
- Small 16-pin VQFN package



Small 16-pin VQFN

Key Benefits

- Flexible RF Building Block solution
- Low power consumption
- High performance
- Flexibility
- Configurability with correction modes
- Best in class intermodulation performance
- Excellent phase/amplitude balance
- Serial bus configuration
- Direct control option for host-less operation

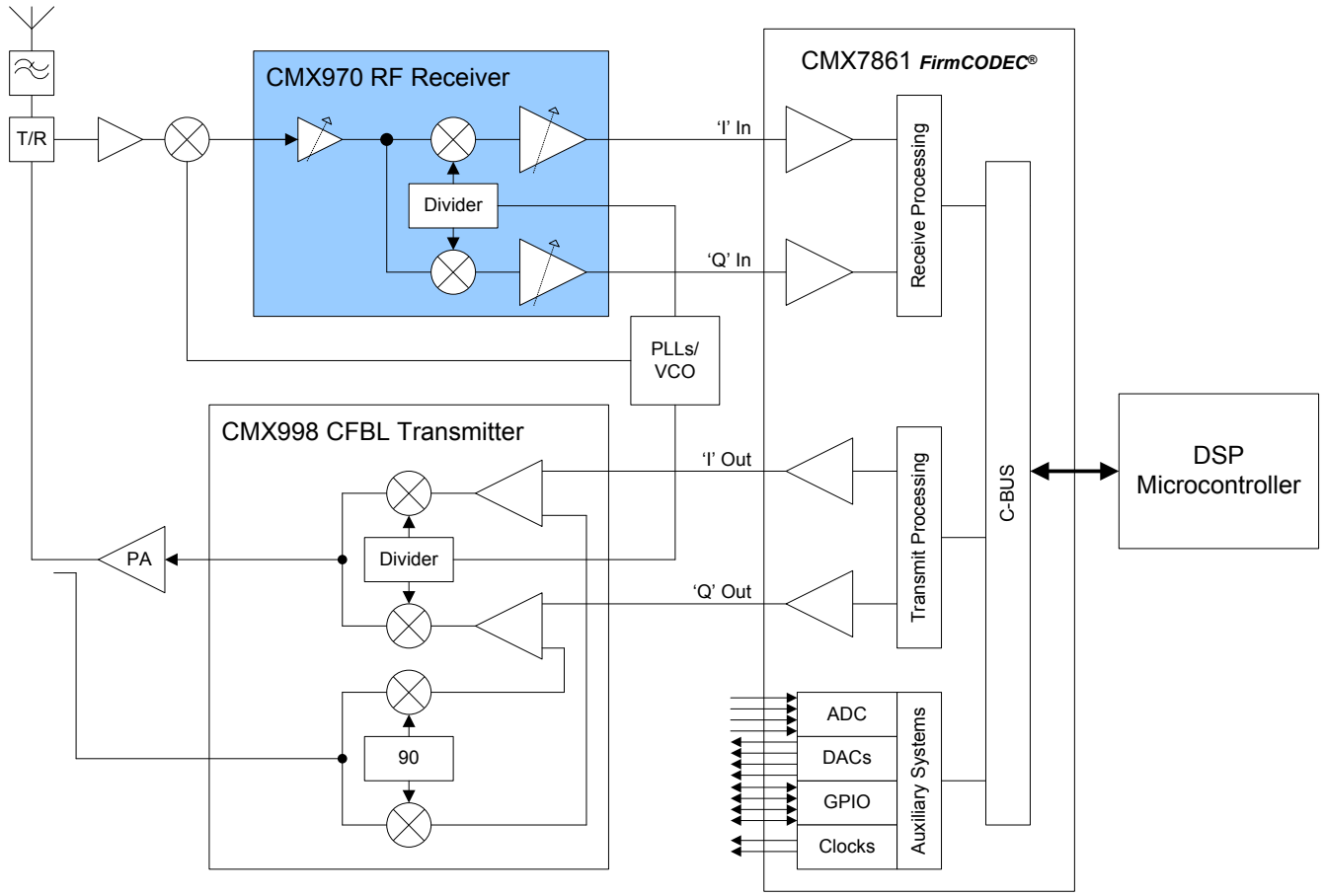


CMX970 Function Diagram

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Quadrature Demodulator

The quadrature demodulator is designed for IF/RF operation and has very low power consumption. Input frequencies in the range 20 to 300 MHz are allowed. The demodulator system has two gain stages, one before and one after the I/Q down-converters and the gain elements can be independently controlled. This flexible architecture allows the users to optimise characteristics depending on their system requirements. Optimum noise figure can be achieved by maximising gain in first gain stage and minimising gain in the second stage. Intermodulation performance can be optimised by decreasing gain in the first or second stages. A lower gain in the second gain stage will tend to reduce dc offsets in the output I/Q signal. Further detailed information on the effects of controlling gain stages is available in the CMX970 datasheet.



Typical system application utilising:

CMX970—IF/RF Quadrature Demodulator

CMX998—Cartesian Feedback Loop (CFBL) Transmitter

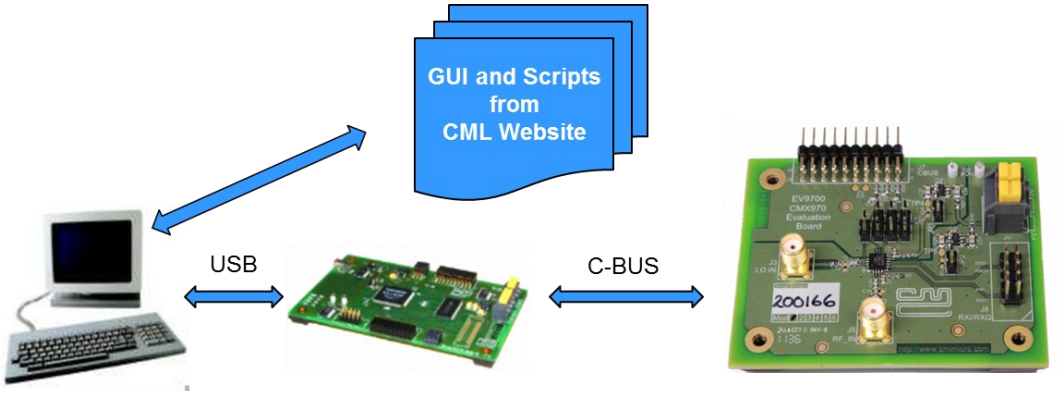
CMX7861—Programmable Baseband Interface IC

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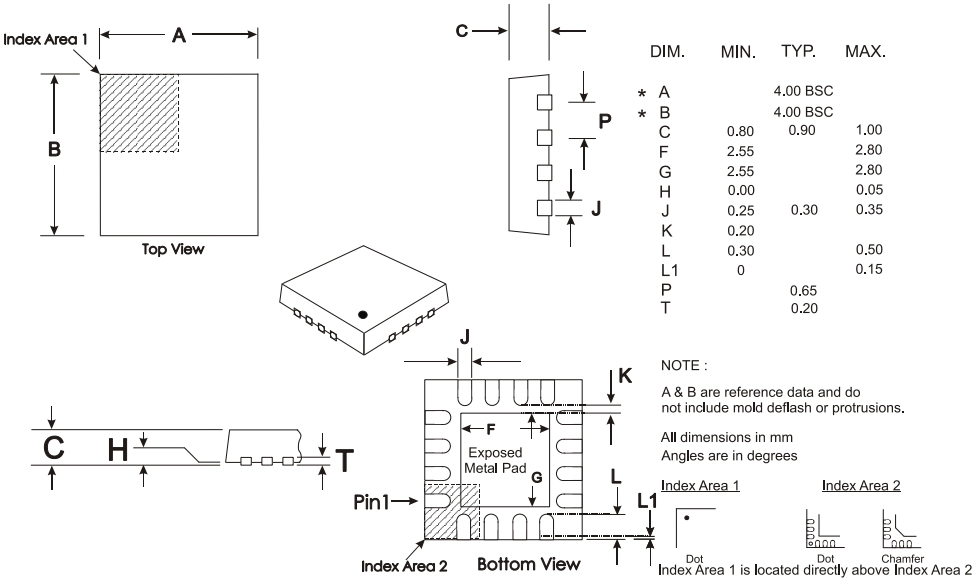
Evaluation Support

The EV9700 is an Evaluation Kit designed for evaluating and demonstrating the capabilities of the CMX970 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 EV9700 board.

A C-BUS interface connector is provided for control of the EV9700 by a host microcontroller or CML PE0002 interface card. The CMX970 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 CMX970/EV9700 serial bus.



Package



DIM.	MIN.	TYP.	MAX.
* A		4.00 BSC	
* B		4.00 BSC	
C	0.80	0.90	1.00
F	2.55		2.80
G	2.55		2.80
H	0.00		0.05
J	0.25	0.30	0.35
K	0.20		
L	0.30		0.50
L1	0		0.15
P		0.65	
T		0.20	

NOTE :
A & B are reference data and do not include mold deflash or protrusions.
All dimensions in mm
Angles are in degrees

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. CMX970Q7

Electrical Specification Summary

Operating Limits	Min	Typ	Max	Unit
Supply Voltage:				
Digital Supply ($V_{DD} – V_{SS}$)	3.0	3.3	3.6	V
Analogue Supply ($V_{CC} – V_{RFGND}$)	3.0	3.3	3.6	V
Operating Temperature	-40	-	+85	°C
Local Oscillator Input	40	-	500	MHz
RF/IF Input	20	-	300	MHz

DC Parameter - Supply Current	Min	Typ	Max	Unit
Total Current Consumption:				
Powersave mode	-	10	-	µA
Bias only	-	1.5	-	mA
Operating	-	15	-	mA

IF/RF Amplifier and Quadrature Demodulator	Min	Typ	Max	Unit
Performance Figures:				
Gain	-	56	-	dB(V/V)
Noise figure	-	10	-	dB
Third order intercept point (input)	-	-15	-	dBm

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

Click here to link to the CML website or search for: CMX970

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