

## CMX972

### Quadrature Demodulator with IF PLL/VCO

(RF Building Block)

#### Introduction

The CMX972 low power quadrature demodulator is part of the CML RF Building Block family of ICs.

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

The CMX972 IF/RF Quadrature Demodulator offers very low power consumption and high-performance over the operating range of 20 - 300 MHz and includes on-chip PLL and VCO.

The wide 10MHz I/Q bandwidth, variable gain adjustment and serial bus (C-BUS) control, 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 CMX972 addresses this with its availability in a very small 32-pin VQFN package (5mm x 5mm x 1mm).

#### Applications

- Wireless Data Terminals
- HF/VHF and UHF Mobile Radio
- Avionics Radio Systems
- Software Defined Radio (SDR)
- Satellite Terminals
- High-performance radio

#### CMX972 Brief Description

The CMX972 features a low-power quadrature IF/RF demodulator with wide operating frequency range and optimised power consumption. The demodulator is suitable for superheterodyne architectures with IF frequencies up to 300MHz and the device may be used in low IF systems or in those converting down to baseband. An on-chip PLL and VCO, together with uncommitted baseband differential amplifiers, provide additional flexibility. Control of the CMX972 is by serial bus.

The small, RF-optimised 32-pin VQFN package and minimal external components make the device ideal for space-constrained applications.

#### Features

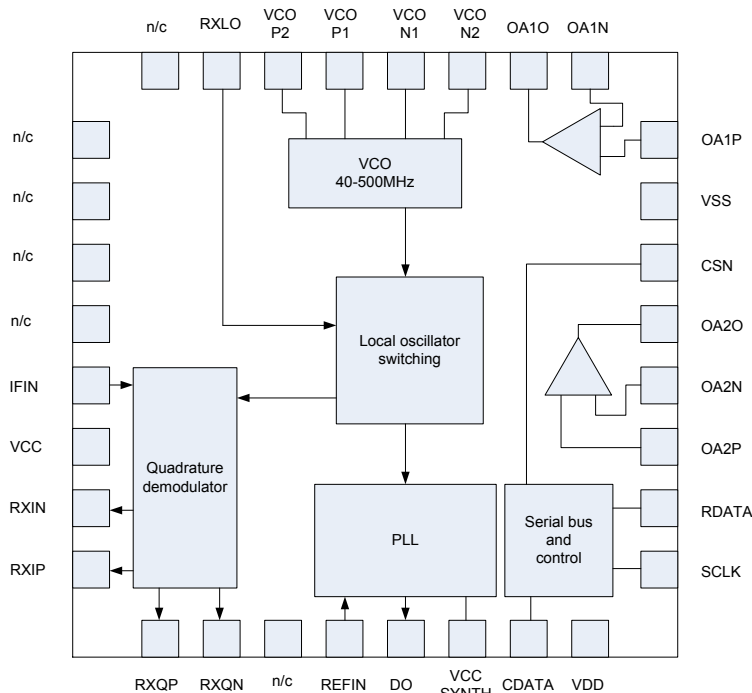
- 20 – 300MHz IF/RF Demodulator
- On-chip PLL and VCO
- 10MHz Rx I/Q Bandwidth
- < 1 degree I/Q Phase Matching
- < 0.5 dB I/Q Gain Matching
- Low Power, 3.0V – 3.6V Operation
- Small 32-pin VQFN package

#### 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
- Simple interfacing to existing modem/baseband products



Small 32-pin VQFN



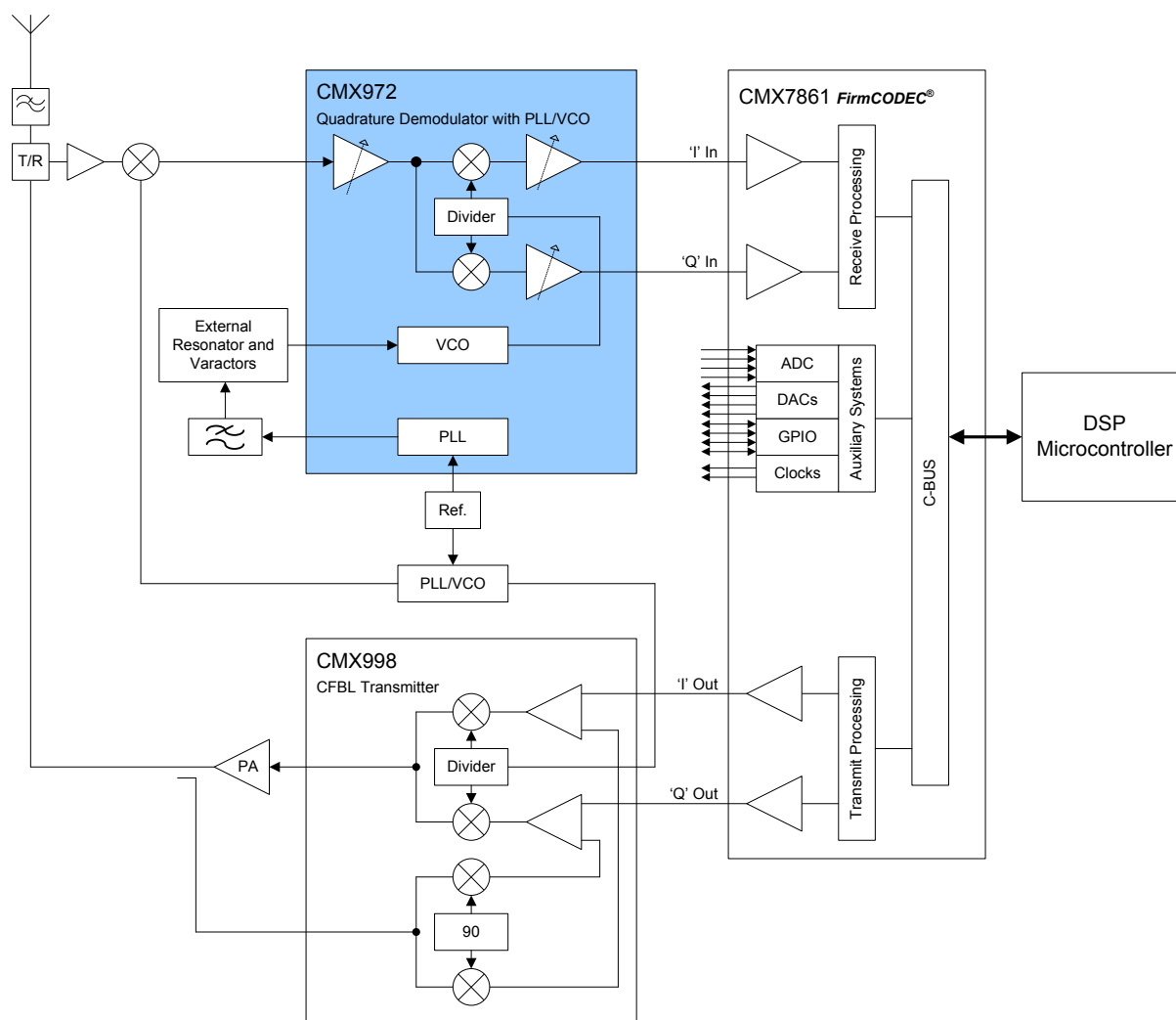
CMX972 Function Diagram



## 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. The inclusion of on-chip VCO and PLL reduces the overall system component count.

Optimum noise figure can be achieved by maximising gain in first gain stage and minimising gain in the second stage. Inter-modulation 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 CMX972 datasheet.



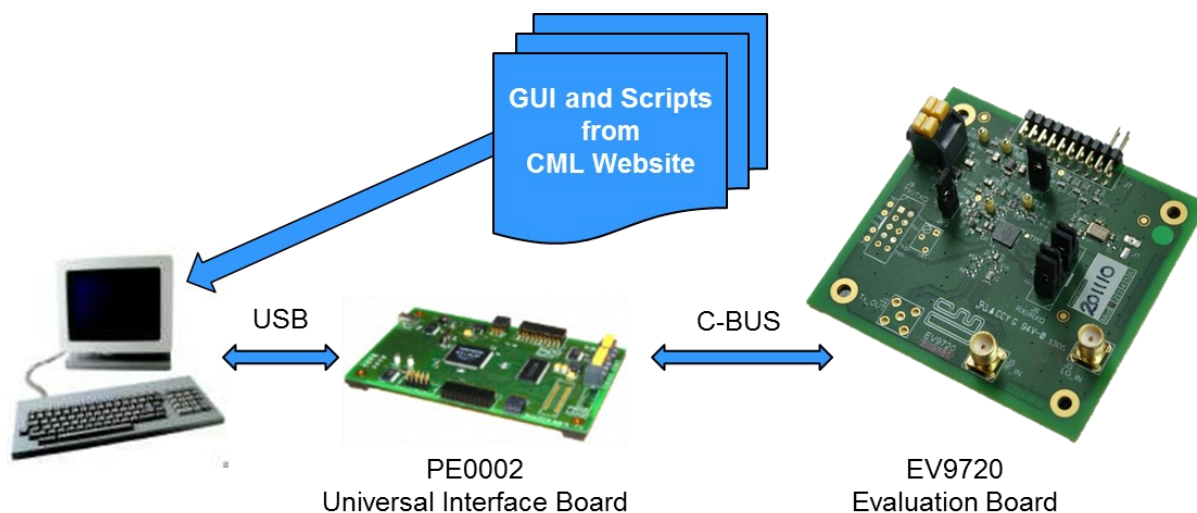
### Typical system application utilising:

- CMX972 - Quadrature Demodulator with PLL/VCO
- CMX998 - Cartesian Feedback Loop (CFBL) Transmitter
- CMX7861 - FirmCODEC™ Programmable Baseband Interface IC

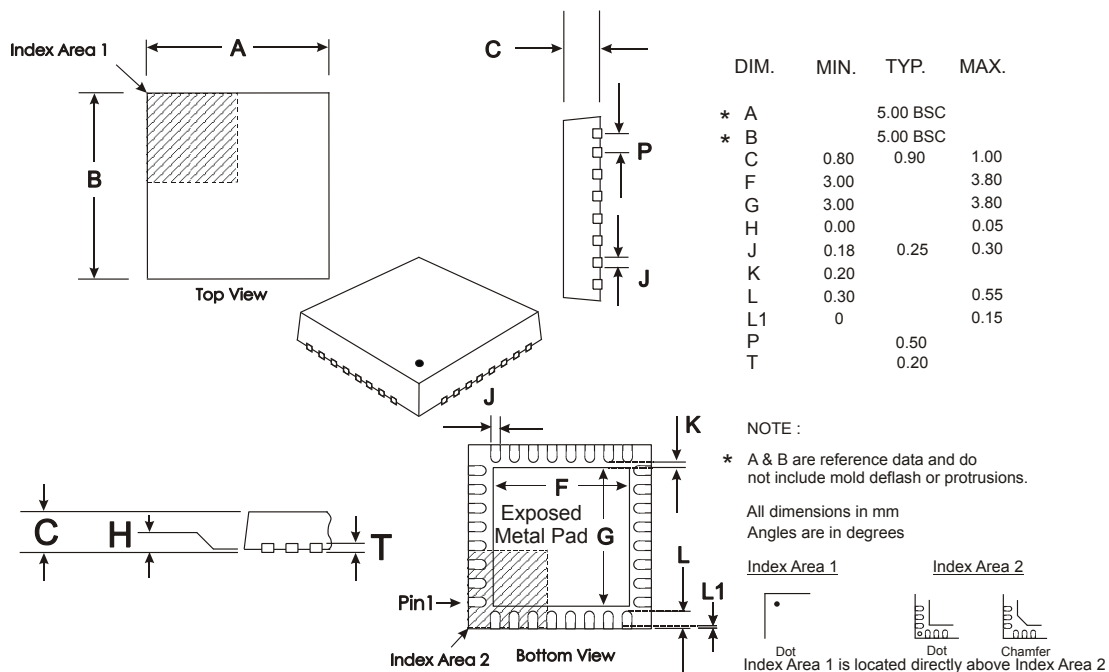
## Evaluation Support

The EV9720 is an Evaluation Kit designed for evaluating and demonstrating the capabilities of the CMX972 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 EV9720 board.

A C-BUS interface connector is provided for control of the EV9720 by a host microcontroller or CML PE0002 interface card. Alternatively any microcontroller evaluation/emulator kit can be used to drive the CMX972/EV9720 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 32-pin VQFN (Q5)

Order as part no. CMX972Q5

## 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 ( $V_{CC} - V_{RF\&GND}$ )	3.0	3.3	3.6	V
IO Supply ( $V_{DIO} - V_{DSS}$ )	1.6		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	-	7	-	µA
Rx only	-	15	-	mA
PLL and VCO	-	9	-	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: CMX972

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Phone:	+44 (0) 1621 875500	+1 336 744 5050 800 638 5577	+65 62 888129
Fax:	+44 (0) 1621 875600	+1 336 638 5577	+65 62 888230
Email Sales:	Sales@cmlmicro.com	us.sales@cmlmicro.com	sg.sales@cmlmicro.com
Email Tech Support:	techsupport@cmlmicro.com	us.techsupport@cmlmicro.com	sg.techsupport@cmlmicro.com
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