

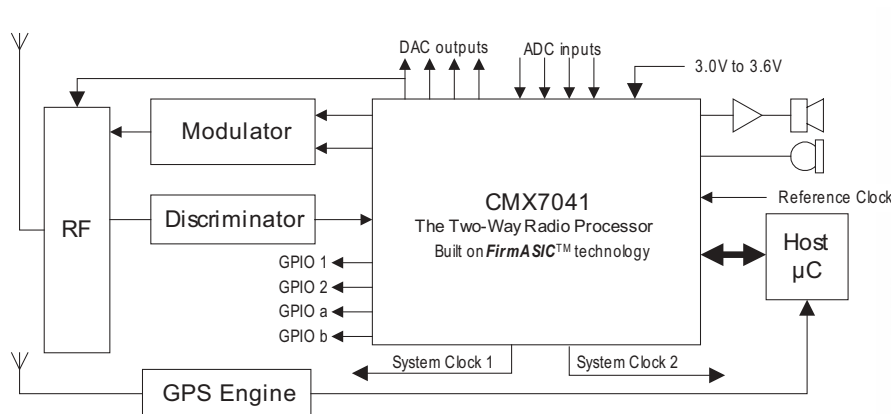
Analogue Radio Baseband Processor with System Clocks and Auxiliary ADCs and DACs

Features

- **Complete audio processing**
 - digital gain control, filtering, companding, pre/de-emphasis, scrambling
- **Tone squelch signalling**
 - 51 CTCSS tones plus user definable tones, DCS and XTSS
- **In-Band signalling**
 - Selcall, two-tone paging tones, DTMF and user-programmable tones
- **Concurrent sub-band and in-band signalling**
- **FFSK/MSK packet data modem**
 - Free format and packet modes with FEC, CRC and interleaving
- **Auxiliary systems**
 - Dual 10-bit ADCs with 4 multiplexed inputs
 - 4 channel 10-bit ADCs, 1 with auto-ramping profile
 - 2 programmable system clocks
- **Reference clock PLL**
- **Single and two-point modulation Tx outputs**
- **C-BUS serial interface**
- **Flexible powersave modes**
- **Function upgrade flexibility built on FirmASIC™ technology**
- **Customisation options**
- **Low power 3V to 3.6V operation**
- **VQFN and LQFP packaging**

Applications

- **Professional and semiprofessional PMR/LMR**
- **Trunking**
- **GMRS, FRS, PMR446, MURS**
- **Marine VHF**
- **Aviation and amateur radio**



Brief Description

The CMX7041 Two-Way Radio Processor enables a revolutionary new platform approach to radio design. It provides a comprehensive feature-set as standard plus a roadmap of function enhancements available through CML's FirmASIC™ technology. The CMX7041 is a full-function, half-duplex, audio, signalling and data processor IC.

It is suitable for the implementation of professional radio (PMR/LMR, Trunking etc.), leisure radio (GMRS, FRS, PMR446, and MURS), Marine VHF, Aviation and Amateur radio products.

The CMX7041 provides concurrent sub-audio-band and in-band signalling, complete audio processing and a comprehensive data modem implementation. The data modem provides a free format data mode and a robust flexible packet data mode, utilising CRC, FEC, interleaving and scrambling.

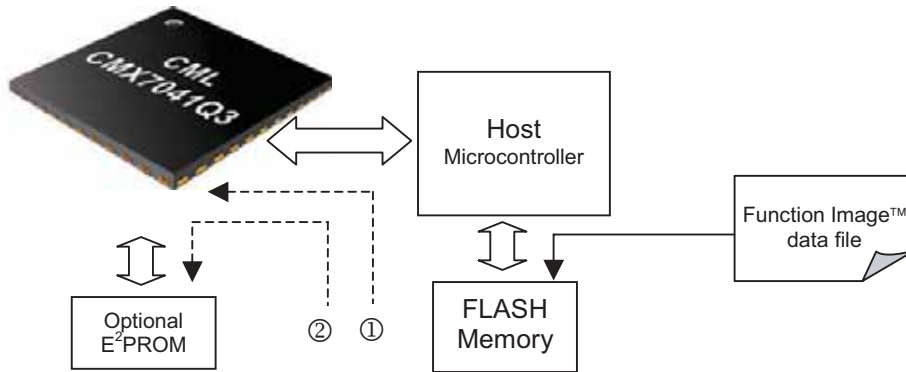
The device features two user programmable system clock outputs and auxiliary ADC and DAC blocks to enable full control of the radio functions and minimise overall chip count.

A user programmable PLL generates all internal clocks and is driven from the the Xtal/reference clock input. This supports a wide selection of Xtal/reference clocks and allows one clock source to be internally reused for both baseband and RF synthesiser functions.

A flexible power control facility allows the device to maximise power-saving whilst not processing signals or when specific functions are not enabled.

Product Configuration

The overall CMX7041 product function and feature-set is determined by a Function Image™, which is a data file that configures its internal systems. The Function Image™ can be stored in the Host microcontroller's FLASH memory and uploaded to the CMX7041 after power-up (1) or transferred to an E2PROM attached to the CMX7041 for automatic uploading of the data file after power-up (2).



Function Image™ data files are retrievable from CML's FirmASIC Portal on the www.cmlmicro.com website. Product specific registration is required and can be arranged through your local CML representative. Periodically, Function Image™ upgrades will be made available to expand the CMX7041's overall function and to enhance its feature-set. Once registered for the CMX7041 you will be automatically notified about product updates as and when they become available.

Function Image™ FI-1.x

The initial Function Image™ (FI-1.x) configures the CMX7041 to provide a comprehensive standard feature-set, as listed below:

Base configuration:

- Single channel half duplex operation
- 3 analogue inputs with input amplifier and programmable gain adjustment for connection to microphone and demodulator sections
- 2-point modulation outputs drivers with programmable level adjustment

Audio processing:

- Channel filtering for 12.5kHz and 25kHz
- Voice-band and sub-audio rejection filtering
- Pre/de-emphasis
- Audio compander
- Digital gain adjustment
- Audio output with digital gain adjustment

Tone squelch signalling:

- Pre-programmed 51 tone CTCSS Encoder/Decoder plus user programmable tone
- Programmable 23/24bit DCS Encoder/Decoder

In-band signalling:

- Programmable Selcall Encoder/Decoder
- Programmable audio tone generator (for custom audio tones)
- DTMF encoder

Data modem:

- 1200/2400 baud FFSK/MSK modem
- Data packet mode incorporating interleaving, FEC, CRC and data scrambler (functions that are suitable for text messaging/paging, caller identification, caller location, digital poll of remote radio location, GPS information in NMEA 0183 format, general data transfer)
- Free format mode

Control:

- C-BUS serial bus interface
- Xtal/clock input with internal PLL

Auxiliary:

- 2 programmable system clock outputs
- 2 auxiliary ADCs with four selectable input paths
- 4 auxiliary DACs, one with configurable auto-ramping profile
- Tx enable output pin
- Rx enable output pin

Function Image™ Upgrade

A Function Image™ upgrade will be available in early 2006. This will add new function modules to the CMX7041 plus enhance a number of modules currently available.

Audio processing:

- Scrambling module – Multi-point single band frequency inversion

Tone squelch signalling:

- XTCSS – advanced tone squelch signalling system

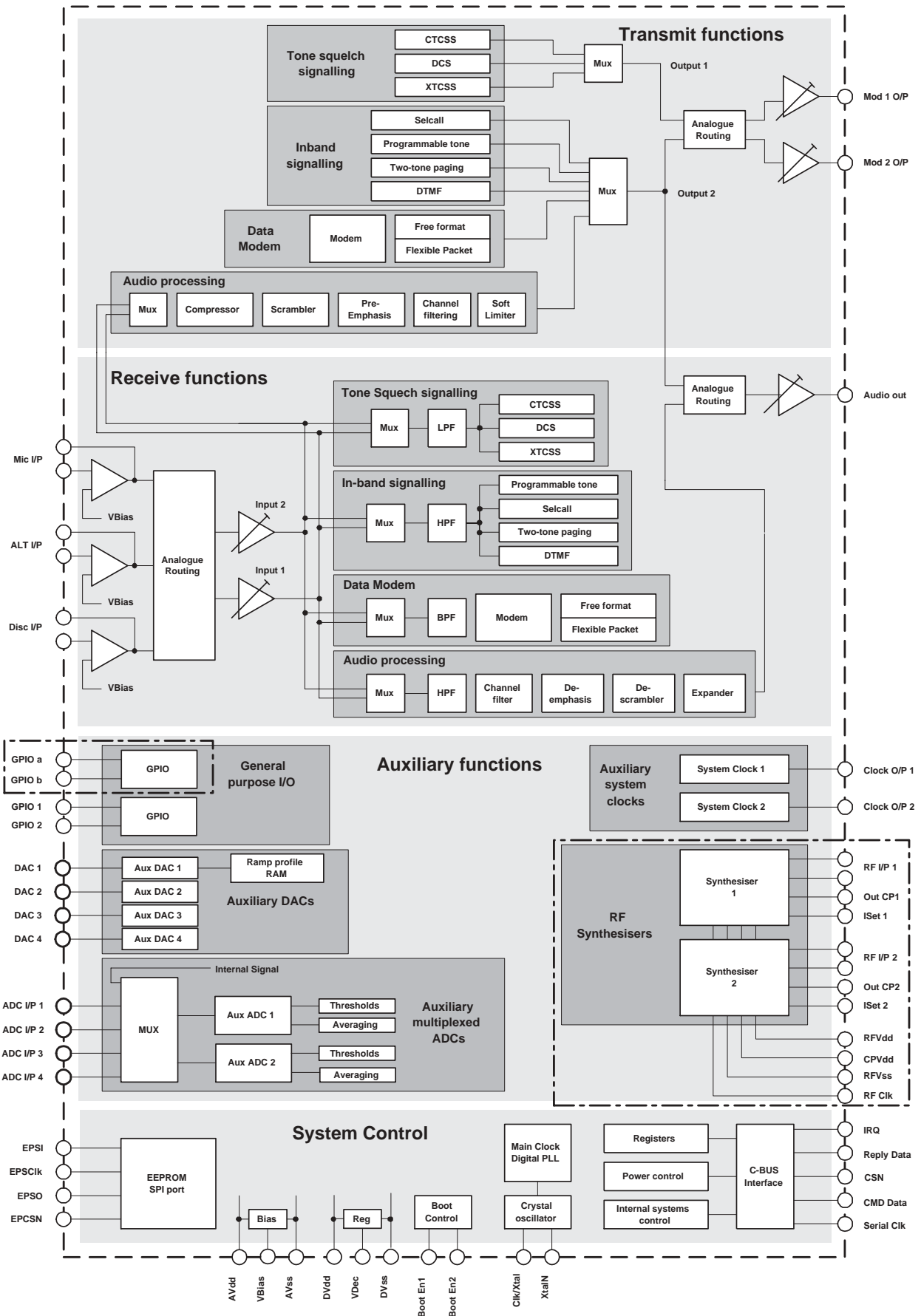
In-band tone signalling:

- Enhanced Two-tone paging operation



Beta Function Images™ will be released from time to time to demonstrate the CMX7041's flexibility and to expand its feature set.

This will allow customers to preview new advanced functions prior to their official release at a later date.



CMX7041 Functional Block Diagram

CMX7041/7031 Version Variants

The above block diagram illustrates the functions available from the CMX7041 and CMX7031 ICs.

Integer-N RF Synthesisers -

Two of these are available from the CMX7031 but are excluded from the CMX7041.

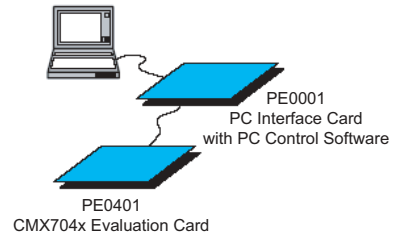
GPIO Functions -

The CMX7031 offers two, the CMX7041 offers four.

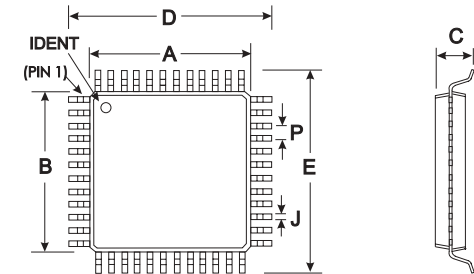
Product Support

The following options are available to support the CMX7041 Two-Way Radio Processor IC:

- PE0401** IC Evaluation Card
- PE0001** Evaluation Kit Interface Card
Connects to the evaluation card and is supplied with a Windows® based application to aid product evaluation



Packaging



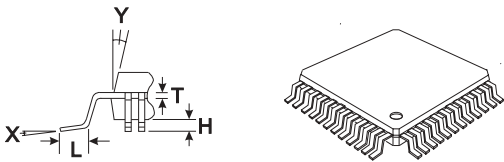
DIM.	MIN.	TYP.	MAX.
* A	6.91	7.11	
* B	6.91	7.11	
C	1.40	1.60	
D	8.74	9.25	
E	8.74	9.25	
H	0.05	0.15	
J	0.10	0.28	
L	0.35	0.76	
P		0.50	
T		0.13	
X	0°		7°
Y	11°		13°

NOTE :

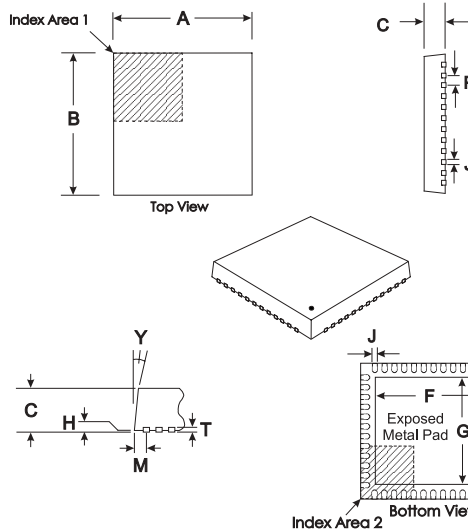
* A & B are reference data and do not include mold deflash or protrusions.

All dimensions in mm
Angles are in degrees
Co-Planarity of leads within 0,1mm

CMX7041L4 48-pin LQFP



CMX7041Q3 48-pin VQFN

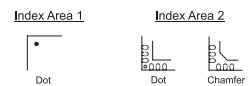


DIM.	MIN.	TYP.	MAX.
* A		7.00 BSC	
* B		7.00 BSC	
C	0.80		1.00
F	2.75		5.25
G	2.75		5.25
G1		0.225	
H	0.00		0.05
J	0.18		0.30
L	0.30		0.50
M		0.75	
P		0.50	
T		0.20	
Y	0°		12°

NOTE :

* A & B are reference data and do not include mold deflash or protrusions.

All dimensions in mm
Angles are in degrees



Index Area 1 is located directly above Index Area 2

About FirmASIC™

CML's proprietary *FirmASIC™* component technology reduces cost, time to market and development risk, with increased flexibility for the designer and end application. *FirmASIC™* combines Analogue, Digital, Firmware and Memory technologies in a single silicon platform that can be focused to deliver the right feature mix, performance and price for a target application family. Specific functions of a *FirmASIC™* device are determined by uploading its Function Image™ during device initialization. New Function Images™ may be later provided to supplement and enhance device functions, expanding or modifying end-product features without the need for expensive and time-consuming design changes. *FirmASIC™* devices provide significant time to market and commercial benefits over Custom ASIC, Structured ASIC, FPGA and DSP solutions. They may also be exclusively customised where security or intellectual property issues prevent the use of Application Specific Standard Products (ASSPs).



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