

CMX7341 FI-6

AIS/DSC Man Overboard Transceiver

Until recently, most Man Overboard solutions have been based solely on AIS or AIS/DSC transmit-only solutions, limited by the fact that regulations prevented receiving vessels from transmitting confirmation of reception back on DSC except under exceptional circumstances when further DSC alerts are received from the same source and the ship in distress is beyond doubt in the vicinity.

Functional Summary

Baseband processor implementing modems for:

- AIS Transmitter
- DSC Receiver
- DSC Transmitter

Technical Features

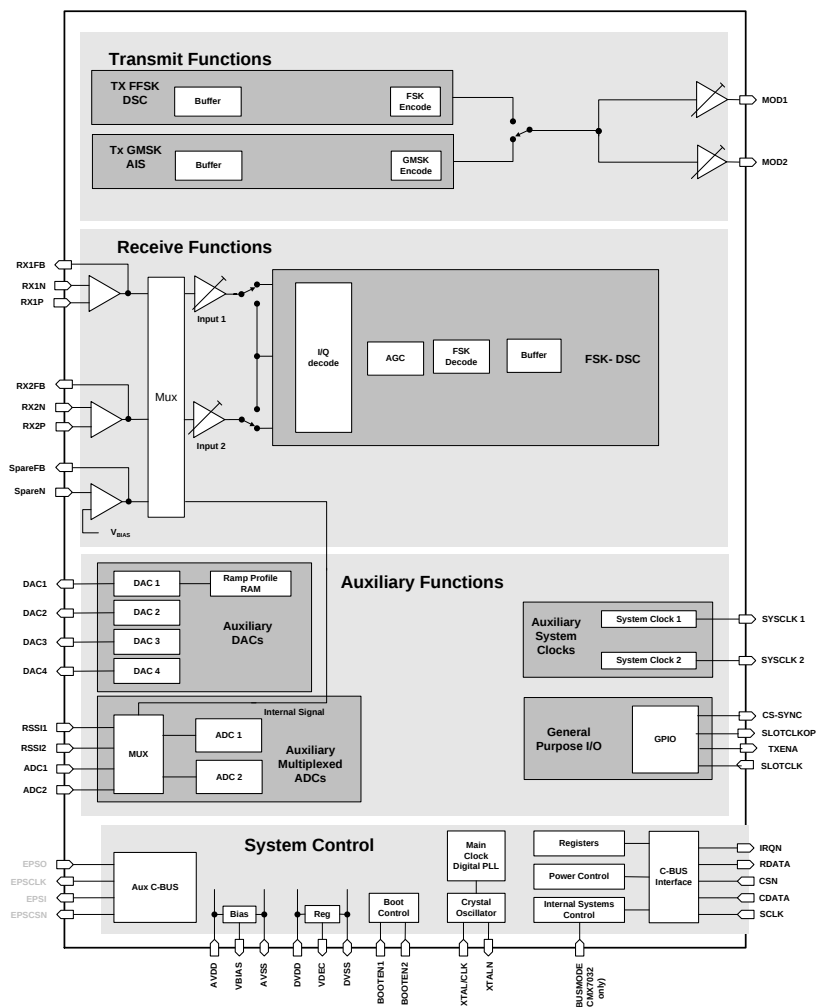
- Single 3.3V supply
- IQ receiver architecture
- 2 point TX modulation
- Control of the CMX994A VHF transceiver including PLL settings
- Power amplifier ramp control
- 48-pin VQFN package

Applications

- DSC enabled MoB devices

This is now changing and the addition of a DSC receive channel to terminate a call is being included in the latest update to regulations.

To support this requirement CML has developed a solution that brings a fusion of AIS and DSC functionality in a single baseband processor. Together with a low cost microcontroller and other ICs from CML it enables low power, small form factor Man Overboard solutions to be realised.



Key Functionality

Operating modes

- AIS transmit (GMSK, 9600bps, 2.4kHz deviation, BT = 0.4)
- DSC transmit (FFSK 1200 baud)
- DSC receive (FFSK 1200 baud)

-114dBm receive sensitivity (using CMX994A Direct Conversion Receiver)

Direct interface to the CMX994A Direct Conversion Receiver including PLL setup

AIS 161.975/162.025MHz

DSC channel 70 156.525MHz

Digital modulation trimming supported

-40 to +85°C operating temperature range

Small outline 7x7 mm 48-pin VQFN package (Q3)

Applicable standards

- IEC 63269-3
- ITU-R M.493
- United States RTCM standard 11901.1
- Australian/New Zealand joint standard AS/NZS 4869.2
- ETSI draft standard EN 303 132-1
- EN 301 025
- BS EN 63269-1

Description

The CMX7341 baseband processor is a multi-functional device that is configured by downloading a small configuration file or Function Image™, downloadable free of charge from the CML Microcircuits Technical Portal. Function Image 7341FI-6 provides the AIS/DSC MOB functionality.

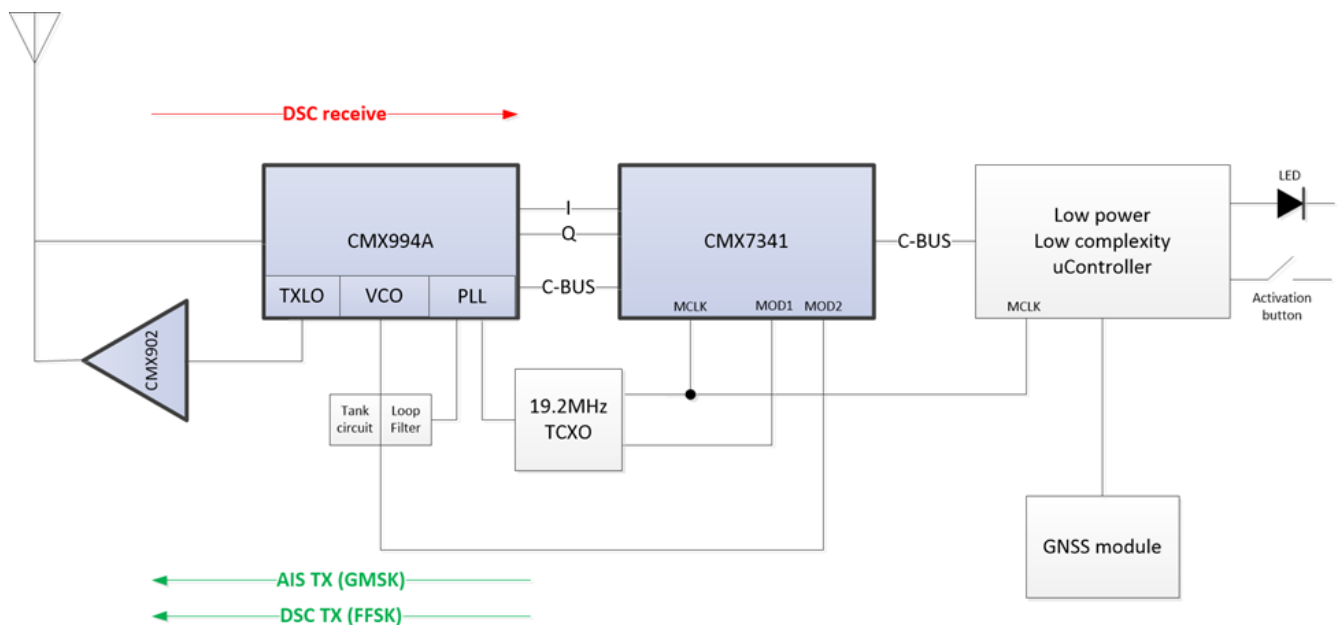
In receive mode the device interfaces to the CMX994A Direct Conversion Receiver providing digital channel filtering, baseband signal demodulation and processing of the received DSC information. This is presented to the system controller via C-BUS (an SPI compatible interface). The receiver offers a high level of RF performance meeting EN 301 025 DSC receiver requirements for sensitivity, blocking, co channel interference and intermodulation in a compact form factor with a minimum of additional external components.

In transmit mode, suitable transmit messages are provided by the external host controller over C-BUS which are then used to generate the necessary modulated signals for transmission, FFSK for DSC or GMSK for AIS. The transmit solution employs 2 point VCO modulation with the CMX7341 FI-6 driving these signals from matched digital to analogue converters and programmable gain amplifiers. Using this architecture allows modulation trimming to be done digitally, removing the need for manual trims in manufacture.

Development support

To assist with the development of MOB solutions CML has evaluation boards for both the CMX7341 baseband processor (PE0403-7341), CMX994A Direct Conversion Receiver (EV9942) and the CMX902 VHF/UHF Power Amplifier (EV9020-160).

Typical Application

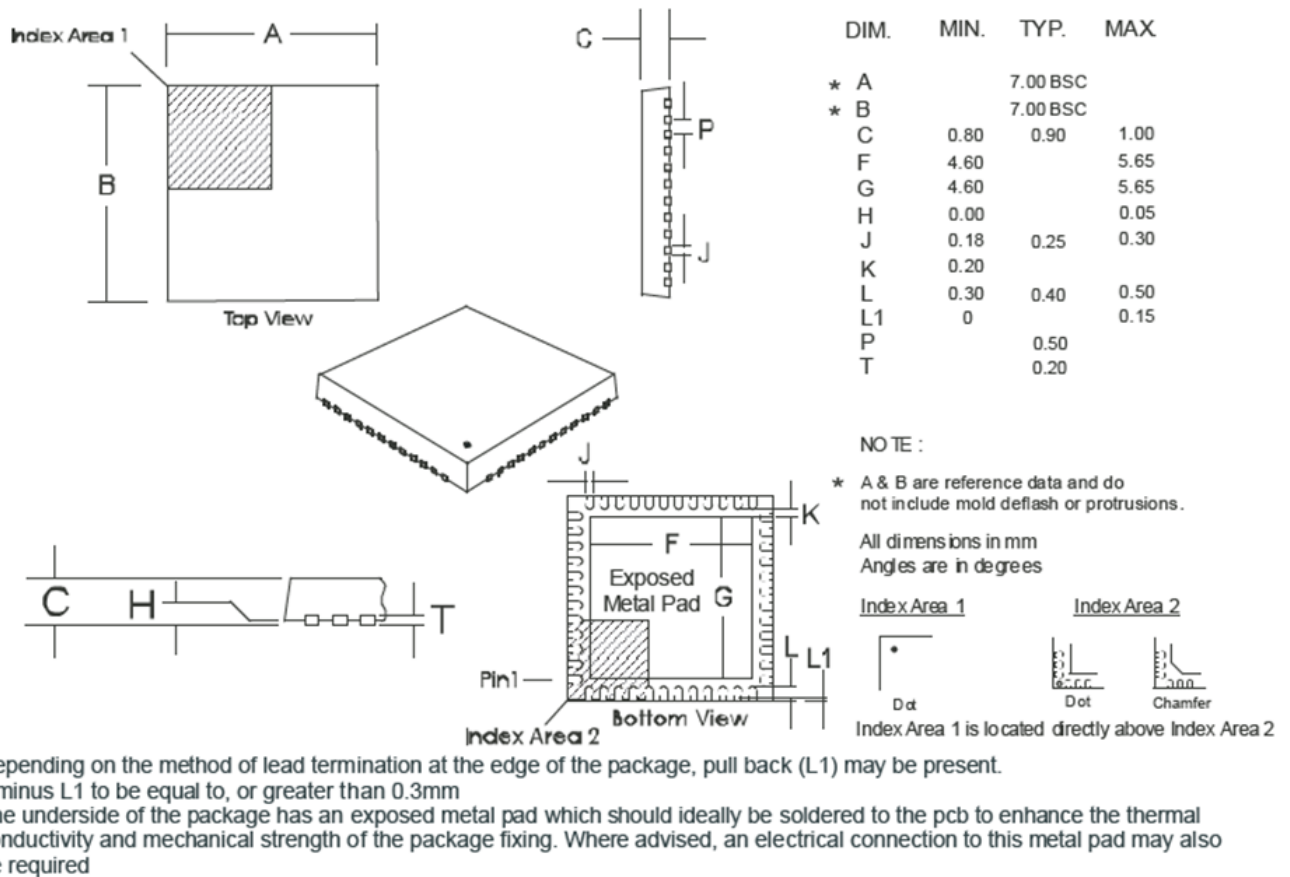


Key Specifications

All parameters specific at Vdd=3.3V, CLK=19.2MHz.

Parameter	Min	Typ	Max	Unit
Supply voltage:				
Main analogue and digital supplies	3.0	3.3	3.6	V
Supply current:				
Sleep		12	120	µA
Receive		8		mA
Transmit		9		mA
Master clock frequency		19.2MHz (±20ppm)		MHz
DSC Receive mode (using CMX994A, internal PLL used):				
Sensitivity 1% BER	-113	-118		dBm
Bit error rate (BER) with 10dB SNR			1	%
Co channel interferer (400Hz tone /3kHz deviation)		2		dB
Blocking @1MHz	-90	-93		dB
Blocking @2MHz	-90	-96		
Blocking @5MHz	-90	-98		
Blocking @10MHz	-90	-99		
ACR adjacent +/-25kHz		66		dB
IMD:				
+/-50kHz no modulation		65.2		dB
+/-100kHz modulation 400Hz deviation 3kHz		65.2		dB
Storage time (filter delay)	–	8	–	bits
DSC Transmit mode FFSK:				
Output Signal Level	–	775	–	mVrms
Output Distortion	–	–	5	%
3rd Harmonic Distortion	–	–	3	%
Logic 1 Frequency	–	1300	–	Hz
Logic 0 Frequency	–	2100	–	Hz
Baud Rate	–	1200	–	bps
Pre-emphasis(per octave)	–	6	–	dB
AIS Transmit mode GMSK, 9600bps, 2.4kHz deviation:				
Bit rate accuracy	–	–	±50	ppm
Filter (RC) Alpha	–	0.4	–	
Tx Output Level (MOD1, MOD2, two-point)	–	2.88	–	Vpk-pk
Tx Adjacent Channel Power (MOD1, MOD2, prbs)	-60			dB

CMX7341 Package



Mechanical Outline of 48-lead VQFN (Q3)

Order as part no. **CMX7341Q3**

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