# EnsembleSeries<sup>™</sup> ClOE-1390

Rugged COM Express Intel Atom Apollo Lake E3900 series SBC module with BuiltSAFE technology



- D0-254/D0-178C PCB & BIOS/Boot code certification kit
- OpenGL SC2.0 graphics libraries for multiple RTOS (Inc. DO-178C cert. kit)
- Intel VTx virtualization and embedded GPU
- Up to 8GB ECC DDR3L RAM (soldered)
- Onboard eMMC and up to 32GB MLC flash memory

Mercury BuiltSAFE<sup>™</sup> technologies bring the highest level of functional and flight safety to COTS processing modules for aerospace and defense applications. Our proven and reusable certification artifacts meet the highest Design Assurance Level (DAL) objectives of DO-178C and DO-254 to save time and cost while decreasing risk in the development of mission computing, avionics, networking and datalink/communications systems.

The EnsembleSeries CIOE-1390 with BuiltSAFE technology has



been engineered for safety certification from the top down, with Mercury's AS9100-C process for Commercial Avionics Certifications to D0-178C/D0-254 systematically applied throughout all phases of development. EnsembleSeries CIOE-1390 modules enable a smooth development and certification process for complex systems, supported by Mercury's in-house safety engineering team and their deep domain expertise.

Based on the Intel Atom® E3900 (Apollo Lake) SoC, CIOE-1390 COM Express Type 10 Mini modules are available in both dual and quadcore configurations. EnsembleSeries CIOE-1390 modules leverage Intel's latest graphics advancements and improved computing performance. Coupled with Mercury's safety-critical BuiltSAFE-GS OpenGL SC2.0 embedded graphics libraries, the CIOE-1390 provides an industry-leading solution for low power, high performance display rendering applications.

#### Mercury Systems is a leading commercial provider of secure sensor and mission processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.

# **Technical Specifications**

#### Processor

Atom Apollo Lake E3900 family

## **Digital display interfaces**

DP 1.2 (++)	4096 x 2160, @ 60Hz (max resolution)
HDMI 1.4	3840 x 2160, @ 60Hz (max resolution)
DVI-D	3840 x 2160, @ 60Hz (max resolution)

## LVDS

Single channel LVDS with one pixel per clock and up to 24-bit color. Maximum pixel clock 112  $\rm MHz$ 

systems.

#### Audio

Intel HD Audio interface as an ordering option

## PCle

Four (4) PCIe Gen-2.0 lanes with the PCIe lane configurations options (4 x1), (2 x1 + 1 x2), (2 x2), and (1 x4), for up to four separate external PCI devices

## USB

Up to four (4) USB 2.0 ports; two (2) USB 3.0 ports as ordering option

## SATA

Two (2) SATA Gen 3 storage interfaces with transfer rates of up to 6 Gb/s

## Ethernet

One (1) 10/100/1000 Mbit Ethernet interface



MAC address Capability to set MAC address

## Storage

Onboard eMMC 5.0 MLC NAND flash with 2GB to 32GB options

## **Board support package**

Green Hills INTEGRTIY-178 tuMP; Sysgo PikeOS; VxWorks 653, DDC-I Deos Windows 10 – non certifiable; Linux – non certifiable

## **Other Interfaces**

#### 12C

One (1) I2C external interface

#### UART

Up to two (2) serial RX/TX ports (16550A compatible)

## Watchdog timer signal

In case of timeout the module provides reset signal to carrier board

## **GPIO**

8 GPIO pins on the COMe connector

# Electrical

## Power

Supply voltage (VCC)12 V DC nominal +/- 20%RTC2.8 V to 3.47 V

## Temperature

Operating temperature Short time operating Ground survival Temperature variation -40°C to +55°C per D0-160G \$4.5 Cat A1 -40°C to +70°C per D0-160G \$4.5 Cat A1 -55°C to +85°C per D0-160G \$4.5 Cat A1/A2 5°C/min per D0-160G \$5 Cat B

## Mechanical

COM Express Type 10 Mini Module dimensions: 84 mm x 55 mm (3.3" x 2.17") – 5mm connector pitch

## **Certification evidence:**

DO-254 - Design Assurance Guidance for Airborne Electronic Hardware DO-178C - Software Considerations in Airborne Systems and Equipment Certification

## **Other Certifications**

ROHS6, 2011/65/EU

## **Product ordering**

DO-254/178 Design Certification Evidence Kit - available upon request



CIOE-1390 functional block diagram

PMIC

5V - 20V



The Mercury Systems logo and the following are trademarks or registered trademarks of Mercury Systems, Inc.: Mercury Systems, Innovation That Matters, and BuiltSAFE. Other marks used herein may be trademarks or registered trademarks of their respective holders. Mercury believes this information is accurate as of its publication date and is not responsible for any inadvertent errors. The information contained herein is subject to change without notice. Copyright © 2019 Mercury Systems, Inc.

Copyright © 2019 Mercury Systems, Inc.



# INNOVATION THAT MATTERS \*

CORPORATE HEADQUARTERS

50 Minuteman Road • Andover, MA 01810 USA (978) 967-1401 • (866) 627-6951 • Fax (978) 256-3599 MERCURY MISSION SYSTEMS INTERNATIONAL S.A.

3481.04E-1219-ds-CIOE-1390

Avenue Eugène-Lance 38, PO Box 584 CH-1212 Grand Lancy 1 • Geneva – Switzerland +41 (0)22 884 51 00