MATTHIEU MAINDROU

SENIOR HARDWARE DESIGN ENGINEER

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Skills

Embedded Electronics, SoC-based platform Design

24 years of experience in designing robust embedded electronics platforms around ARM and RISC processors and FPGA for the harsh maritime consumer electronics industry

PCB Layout

Clear understanding of PCB tracking requirements to meet high speed signal integrity , power supply designs and EMC compliance.

Wireless RF Development

Embedded WiFi and Bluetooth BLE design experience

GPS / GNSS Integration

Experienced with GPS and GNSS integration in products, optimising antenna gain versus embedded noise to ensure the best possible performances for the end user

LCD Display / Touch Technology

Knowledge of TN and IPS displays as well as associated Touch screen technologies with an emphasis on outdoor/direct sunlight readability

FPGA programming

More than 3 years developing VHDL code on Xilinx and Altera FPGAs, targeting Radar and Sonar platforms

Environmental Testing

Experience in designing for the harsh conditions of the maritime environment, assessing suitability of the electronics design under vibration and extreme temperature stresses.

Profile

- **Senior Hardware Design Engineer** developing high speed digital, analogue and RF electronics for the embedded industry, taking the product from concept design to prototype and through implementation into manufacturing
- **Over 24 years of Electronics Design Experience** creating detailed circuits with CAD software for embedded microprocessor-based platforms and related analogue/digital circuits.
- **More than 3 years of FPGA Programming** in VHDL, targeting Xilinx Spartan and Altera Cyclone FPGA device families.
- **Wireless / RF / Antenna Integration Experience** testing and validating WiFi, Bluetooth, UHF , GPS and GNSS designs
- **PCB Layout** supporting role to ensure High Speed Signal Integrity / PSUs and Electro-Magnetic Compatibility requirements are met
- **EMC Testing** assisting role to ensure successful certification of the product for worldwide commercialisation

Skills Summary

- Experienced with many electronics devices used in EMBEDDED SYSTEMS developments
- Experienced with many HARDWARE interfaces and communication protocols
- Good understanding of LCD & DISPLAY technologies for outdoor use
- Programming DSP cores in VHDL for FPGAs
- Experience in LABVIEW programming
- Understanding of GPS and GNSS technologies.
- Experienced with CAD software tools for SCHEMATIC capture, PCB Design and SIMULATIONS
- Understanding of PCB LAYOUT techniques
- HIGH SPEED signaling & RF experience

Professional Experience

Sep 2001 - Present

Senior Hardware Design Engineer (embedded electronics)

Raymarine Ltd, a Teledyne-FLIR company (Fareham, U.K.)

- Led the design and development of cutting-edge hardware and electronics systems for Raymarine Ltd, a leading marine electronics company, resulting in innovative and high-performance products.
- Collaborated with cross-functional teams to define project requirements and specifications, ensuring the successful delivery of multifunction displays, docking systems, radar, sonar/fish-finders, GPS sensors, and thermal cameras.
- Conducted rigorous testing and validation of hardware designs, ensuring compliance with EMC industry standards and regulations.
- Maintained clear and concise documentation throughout the design process, facilitating seamless knowledge transfer and effective collaboration with team members.
- Effectively communicated complex technical concepts to non-technical stakeholders.
- Consistently adhered to project timelines and deliverables, meeting or exceeding expectations.

Oct 2023 - Present

Responsible for the development of the electronics to drive the payloads for an advanced maritime camera.
SLD Laser , Long Range finder, Adaptive spotlight lens control, PSU , MOSFET , STM32 MCU, Nvidia OrinNX SoC

April 2023 - Sept 2023

Responsible for developing the electronics around Microchip PolarFire-SoC (FPGA+SoC) to be used as part of a next generation of sonars and radars
Polarfire-SoC , DDR4 , RISC-V , JESD , LVDS , Libero , MSS Configurator

Dec 2021 - Jul 2023

Responsible for bringing to completion, the development of a new platform designed around the Rockchip RK3399 SoC: axiom-2-xl
Rockchip RK3399 , HDMI-in , HDMI-out , LCD dithering , PCAP Touch.

Oct 2020 - Jun 2021

Responsible for the development of a new platform designed around the Rockchip PX30K SoC : alpha-series-instrument displays
Rockchip PX30, Nordic nRF radio SoC, BLE, IPS Display, LVDS, 10/100 Ethernet Switch, Touch, Android

Oct 2018 - Oct 2020

Responsible for the development of a new platform used as an auto-docking system and designed around the Nvidia Jetson TX2 family of SoCs.
docksense-control-systems

Jetson TX2/TX2-4G , Jetson Nano, Jetson Xavier NX, Linux, Machine Vision, Stereoscopic cameras , M.2 SSD , SATA , STM32 , FPGA

Skills

Electro-Magnetic Compatibility

Many years supporting in-house E.M.C. testing in order to address any shortcomings in the prototyped concepts, and adapting the design at both HW & FW levels in order to reach certification of the products.

Good familiarity with Linux/Android for the purpose of testing the HW

Able to verify and test the hardware using reasonable knowledge of various Linux console commands
Familiarity with git process to overlook low level firmware changes to help in driving the hardware to meet requirements.

Languages

ENGLISH - Fluency in both colloquial, formal and technical English.

FRENCH - Fluent (native speaker)

GERMAN - Basics (self-studied towards A1 level of the European Common Framework)

Patents

Polarization Alignment for Wireless Networking systems (9577312 Granted)

Digital Radar or Sonar Apparatus (9024816 Granted)

Networkable Sonar Systems and Methods (10338195 Granted)

2016 - 2018

Responsible for the development of a new platform designed around a Rockchip Quad-Core ARM processor to be used across a range of Android Multi function displays. Axiom-series

RK3288 SoM, DDR3(L), HDMI, MIPI CSI, DSI, GbE, PoE, USB 2.0, SDIO 3.0

2015 - 2016

Responsible for the development of a new Sonar Hardware platform based on the Altera Cyclone V SoC FPGA.

Altera Cyclone V, SoC FPGA, Qsys, VHDL, Sonar, DDR3, Flex-Rigid, PTP

2014 - 2015

Responsible for the development and integration of a new GPS/GNSS module embedded within Raymarine's range of displays, utilising the Ublox M8 chipset, resulting in improved accuracy and performance of GPS functionality.

Responsible for the design of an active GPS/GNSS antenna: ga150-gps-external-antenna

Successfully integrated and verified antennas, ensuring optimal signal reception and minimizing interference.

Designed the RF chain, optimizing signal transmission and reception for maximum efficiency and reliability.

Quantified and eliminated self-generated noise, enhancing the overall signal quality and reducing potential interference.

2012 - 2014

Responsible for the development and verification of an HD-SDI Video input port for a new range of Chartplotter gS19: gs-series

HD-SDI, Zo =75 ohms,S-parameter, BNC, Cable equaliser

Responsible for enhancing an RF Wireless Link at UHF frequencies, in TackTick's Wireless Wind transmitter: wireless-wind-transmitter-t120

TEM waves, Reflections, Absorptions, Polarisation, Antenna tuning

2011 - 2012

Responsible for the development of an embedded GPS module and its integration based around the Ublox AMY-6 chipset

Antenna qualification, RF chain testing, noise quantification and cancellation

Responsible for the development of an OMAP4460 based Chartplotter platform for the gS-series range: gs-series

OMAP4460, HDMI output, Gigabit Ethernet, WLAN, Projected Capacitive touchscreen (P.CAP), PowerOverEthernet (PoE) , CAN

Responsible for the development of an Automated Test fixture to validate antenna integrations in Raymarine's Wireless and GPS based products.

H/V/RHCP/LHCP Polarisation, Antenna 3D gain, LABVIEW GUI design

2010 - 2011

Responsible for adapting and porting the RADAR FPGA VHDL code across to a new FPGA family and new platform

Xilinx Spartan VI, FPGA, VHDL coding, Simulation, DSP algorithms, BlackFin DSP, LVDS

2008 - 2010

Responsible for the development of a brand new platform based on the Texas Instruments new OMAP4430 System on Chip : e-series-widescreen-chartplotter

OMAP4430, PoP LP-DDR2, eMMC, micro-SD, MIPI CSI, MIPI DSI, WiFi, Bluetooth, 802.11 b/g, CAN, Surface Capacitive Touchscreen, LED Backlighting, High Speed Digital Design, LVDS, Layout for EMI, EMC

Responsible for the development of an Automated LCD Optical Test Fixture to qualify Raymarine's LCD Displays for Maritime Environments

Chromaticity, Reflectivity, Sun Viewability, Polarisation, Clearing Temperature, LabView GUI design

2006 - 2008

Responsible for the design of the new C-series range of Chartplotter, based around the TX4939 RISC processor: c-series-classic-chartplotter

Toshiba TX4939, DDR2, JTAG, PCI, NAND, NOR, CCFL Backlight, CF Card (IDE), SPI, I2C, UART, TN LCD, GPS, CAN, Helical Antenna, NTSC/PAL, High Speed PCB Layout, EMC

2004 - 2006

Responsible for delivering the FPGA processing core code written in VHDL for a new RADAR product. hd-radar

Xilinx Spartan III, FPGA, VHDL coding, ModelSim Simulation, DSP algorithms, CORDIC, Adaptive CFAR, LVDS, SHARC DSP

2003 - 2004

Responsible for designing the electronics for a new standalone GPS receiver based on the Sirf Star III chipset: raystar125-gps-antenna

GPS, Antenna, SirF Star III, NMEA 0183, NOR Flash

2001 - 2003

Responsible for designing a new platform around a custom ASIC: raychart-320-gps-plotter

ASIC, SDRAM, NOR, CF Card (IDE), TN LCD Screens

Aug 2000 - Aug 2001

Hardware Design Engineer, (University industrial placement)
Cognito Ltd (Newbury, U.K.)

Company Business: Design of Mobile data communication terminals & network operator.

Responsible for developing and integrating the display features for Mobile data Terminals

Responsible for reviewing and consolidating the GPS receiver code written in C language.

Education

July 2004 - July 2005

VHDL Expert, VHDL Advanced and VHDL Comprehensive
Doulos (Bournemouth, U.K.)

1998 - 2000

B.Eng. Electrical, Electronic and Communication Engineering
University of Plymouth (Plymouth, U.K.)

1996 - 1998

D.U.T. Génie électrique et informatique industrielle
Institute of Technology (Angers, France)

1993 - 1996

Baccalauréat of Science (A-level equivalent)
Lycée Charles De Montesquieu (Le Mans, France)

Technology Skills

ARM ~ NVIDIA ~ ROCKCHIP ~ POLARFIRE ~ STM32 ~ ATMEL ~ DDR3 ~ DDR4 ~ LPDDR4 ~ FPGA ~ NAND ~ NOR ~ SDIO ~ EEPROM ~ LED ~ CCFL ~ 10/100/1000 Gbe ~ WLAN ~ CAN ~ BLUETOOTH ~ MIPI CSI ~ MIPI DSI ~ HDMI ~ eDP ~ HD-SDI ~ NTSC / PAL ~ IDE ~ SDMMC ~ PCIe ~ I2C ~ UART ~ USB 2.0 ~ USB HSIC ~ USB 3.x ~ LVDS ~ SoM ~ TN LCD ~ IPS LCD ~ GPS ~ GNSS ~ LABVIEW ~ LT SPICE ~ VHDL ~ PCB ~ EMC ~ CADSTAR ~ ALTIUM ~ HYPERLYNX ~ ANDROID ~ LINUX ~ WINDOWS