Software Defined Sonar

Sonar Prototype Rapid Development & Verification Platform

Underwater Acoustic DAQ & Signal Processing Board

FPGA + Dual-Core NPU Edge AI Acquisition Platform



Overview

This acoustic acquisition and processing board is a modular embedded computing platform integrating dual-core CPU, NPU and programmable FPGA. It serves as the core digital front-end for underwater acoustic systems and is built as a **sonar prototype rapid development & verification platform**. It supports hydrophone array signal acquisition, waveform preprocessing, DDS excitation signal generation and edge-AI analysis.

The platform supports dual operating systems: Embedded Ubuntu for algorithm development and data logging, and RTOS for low-latency synchronous control. Abundant peripheral interfaces and open C/C++ & Python SDK significantly cut down the development cycle for underwater acoustic prototypes and commercial systems. Receiver and transmitter modules can be expanded on demand.

Important Note: This product is a bare circuit board module. It does not include pressure housing, waterproof encapsulation, hydrophones, transducers or power amplifiers. Pressure-resistant housing is available as a separate customization item.

Key Features

- Dual-core + NPU, supports edge AI
- 1GB RAM + 16GB storage, expandable
- Linux & RTOS supported
- SDK with C/C++ & Python, for rapid prototyping and formal product development
- Fully modular design, flexible expansion of receiver and transmitter modules
- Max 10Msps, 16-bit sampling
- FPGA: 50K / 100K / 200K logic cells optional

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Technical Specifications

Item	Specification
CPU	Dual-core processor + NPU, support edge-AI computing
Memory & Storage	1GB RAM +16GB eMMC, expandable
FPGA	50K / 100K / 200K logic cells optional
Custom I/O	14-channel, configurable for IIS, SPI, UART, GPIO
Communication	Gigabit Ethernet, WIFI, Bluetooth
Signal Input	32 channels, single-ended / differential configurable, max 10Msps 16-bit sampling
DDS Output	0.1-1MHz analog signal; amplitude 1mV-3V configurable
Channel Self-test	DDS loop-back for full signal chain self-diagnosis
Storage	On-board RTC; TF card support up to 2TB
Aux Power	Supports 12V low-ripple, low-noise analog power output
Peripherals	Supports IIS / PWM power amplifier interface; 5.5-inch LVDS touch screen
OS	Embedded Ubuntu (Linux), RTOS supported
Power Supply	6-100VDC
Power Consumption	≤4W
Dimension	L150 × W75 × H80 mm
Architecture	Fully modular, receiver & transmitter modules expandable
SDK	C/C++, Python for prototype & commercial product development
Available Signal Acquisition Modules (Compatible)	1-channel: 10MHz/16bit, gain 0-60dB, bandwidth customizable; 4-channel: 4MHz/16bit, gain 0-60dB, bandwidth customizable; 4-channel: 512kHz/24bit, gain 0-60dB, bandwidth customizable; 8-channel: 2MHz/16bit, gain 0-60dB, bandwidth customizable, stackable up to 32-ch; 32-channel: 10-80MHz/14bit, gain 15/18/21dB, IQ data output supported
Power Amplifier Modules (Compatible)	10Hz-40KHz IIS digital power amplifier, max 300W@4Ω, impedance matching customizable; 40KHz-1MHz PWM power amplifier, max 100W, impedance matching customizable; 40KHz-1MHz PWM power amplifier, max 2000W, impedance matching customizable;

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