



AIR-T Embedded Series Product Line



Overview

Deepwave's AIR-T is the first software defined radio with embedded high performance computing. It contains three unique digital processors for any application:

- FPGA for strict real-time operations
- GPU for highly parallelized processing
- CPU for control, I/O, and software applications

The AIR-T allows users to easily incorporate artificial intelligence into their radio frequency and wireless technologies.

This versatile system can function as a highly parallel SDR, data recorder, or inference engine for deep learning algorithms. The embedded GPU allows for SDR applications to process bandwidths greater than 200 MHz in real-time.

Key Specifications

- **Dual Channel MIMO Transceiver**
 - 300 MHz to 6 GHz
 - 100 MHz bandwidth Rx (per channel)
 - 100 MHz bandwidth Tx (per channel)
- **Digital Signal / Deep Learning Processors**
 - Xilinx Artix 7 FPGA
 - NVIDIA Jetson TX2
 - ARM Cortex-A57 CPU (4 core)
 - NVIDIA Denver2 CPU (2 core)
 - NVIDIA Pascal GPU (256 core)
 - 8 GB of memory
- **Connectivity**
 - GPS Sync via 1 PPS and 10 MHz
 - USB 3.0, USB 2.0/3.0, SATA
 - High-speed digital I/O (GPIO/UART)
 - 1 Gbps Ethernet
- **Dual Power Mode:**
 - 22 / 14 Watts

Software Support



CUDA

**GPU
Acceleration**

HPC with CUDA
toolkit using
C/C++ or Python
interfaces



GNU Radio
THE FREE & OPEN SOFTWARE RADIO ECOSYSTEM

**Signal
Processing**

Support for
industry leading
SDR development
environment



TensorFlow

**Deep
Learning**

Train and deploy
AI systems using
standard
frameworks

Operating System

AirStack

(Derived from Ubuntu)



Mechanical

- Size - 6.7 x 6.7 x 1.4 inches
- Weight - 0.35 kg (0.8 lbs)

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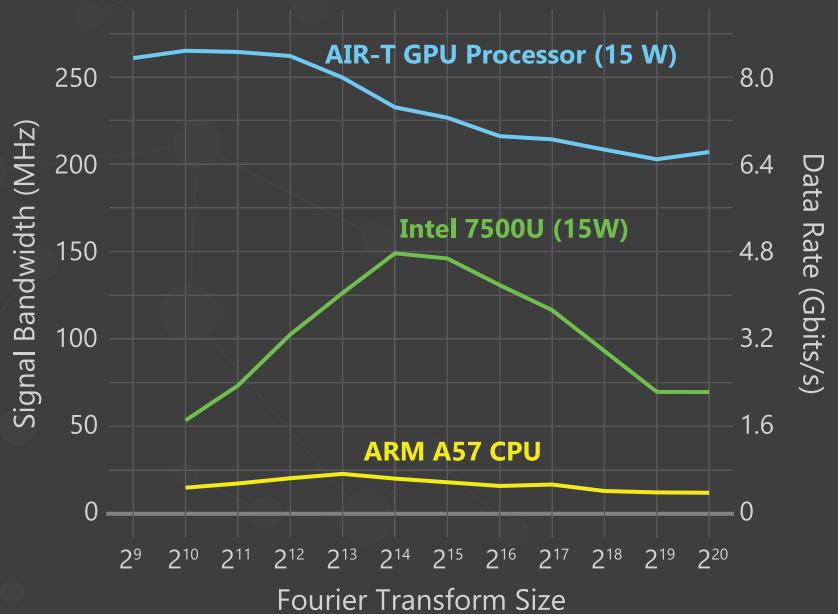
Performance

The AIR-T uses **256 GPU cores** to create a highly parallel compute environment making wideband processing for software defined radio (SDR) applications obtainable.

Using the embedded NVIDIA Jetson TX2 the AIR-T provides **250% bandwidth improvement** over a power-comparable CPU and **1,350% bandwidth improvement** over an embedded CPU for real-time SDR applications.

The AIR-T uses **zero copy** memory access to overcome the data transfer overhead typically associated with GPU processing.

Real-time DSP Measurements



Applications

Pre-trained
AI Cores

User Developed
Applications

AI
Frameworks

DSP
Frameworks

AIR-T Hardware Abstraction

AIR-T Hardware

Embedded Series Models

	AIR7101-A	AIR7101-B	AIR7201-A	AIR7201-B
GPU Cores	256	256	256	256
CPU Cores	6	6	6	6
Shared Memory	8 GB	8 GB	8 GB	8 GB
FGPA Model	XC7A75T	XC7A75T	XC7A200T	XC7A200T
Logic Cells	75,520	75,520	215,360	215,360
DSP Slices	180	180	740	740
Memory	3,780	3,780	12,140	12,140
Enclosure	No	Yes	No	Yes

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