

DEEPWAVE

DIGITAL

Artificial Intelligence Radio Transceiver (AIR-T)

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



Keras



TensorFlow

Deep Learning

Train and deploy
AI systems using
standard
frameworks

Operating System
Ubuntu 18.04



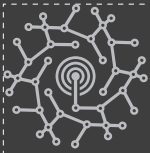
Mechanical

- **Size** - 17.0 x 17.0 x 3.5 cm
- **Weight** - 0.35 kg

Deepwave Digital, Inc.

1429 Walnut St, Suite 1000, Philadelphia, PA 19102

www.deepwavedigital.com salesteam@deepwavedigital.com



AIR-T Embedded Series Product Line

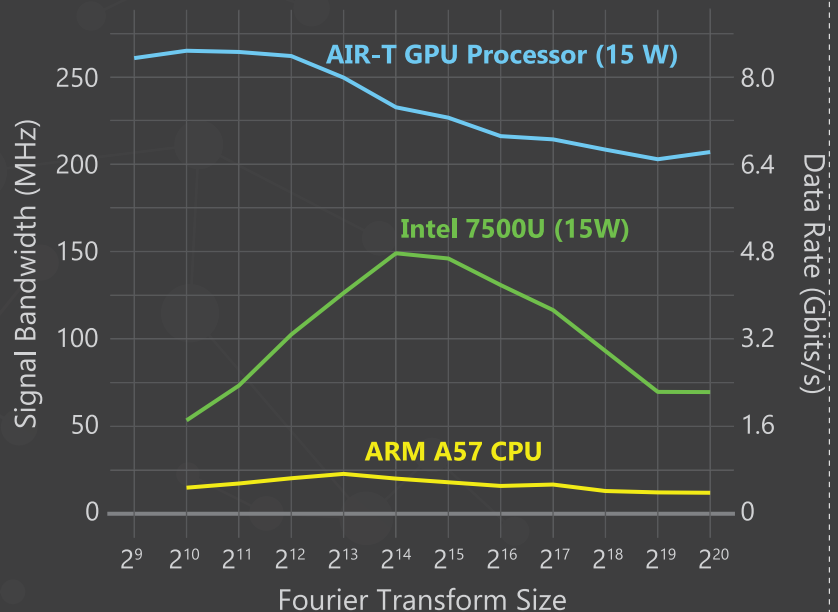
Performance

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

Deepwave Digital, Inc.

1429 Walnut St, Suite 1000, Philadelphia, PA 19102

www.deepwavedigital.com salesteam@deepwavedigital.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Deepwave Digital:](#)

[AIR7201-A](#) [AIR7201-B](#) [AIR7101-A](#) [AIR7101-B](#)