

AIOM-VNXP Analog I/O Module



Scalable, Software-Defined RF Performance
from LEO to Cislunar Missions

The AIOM-VNXP Analog I/O Module is a high-performance, software-defined RF front-end designed to transform how space-based mission processing systems handle analog and digital signals.

As part of the MAMBA family, it leverages a standards-based VNX architecture to scale from proliferated LEO constellations to Class A national asset missions, operating from vLEO to cislunar space. Built around the TI AFE7950 RF sampling transceiver, the AIOM-VNXP integrates dual receive and transmit channels plus an observation channel into a compact, SWaP-optimized VNX+ form factor. Covering 650 MHz to 8 GHz with 1200 MHz instantaneous bandwidth, the module directly samples and generates RF signals, eliminating complex, discrete RF chains.

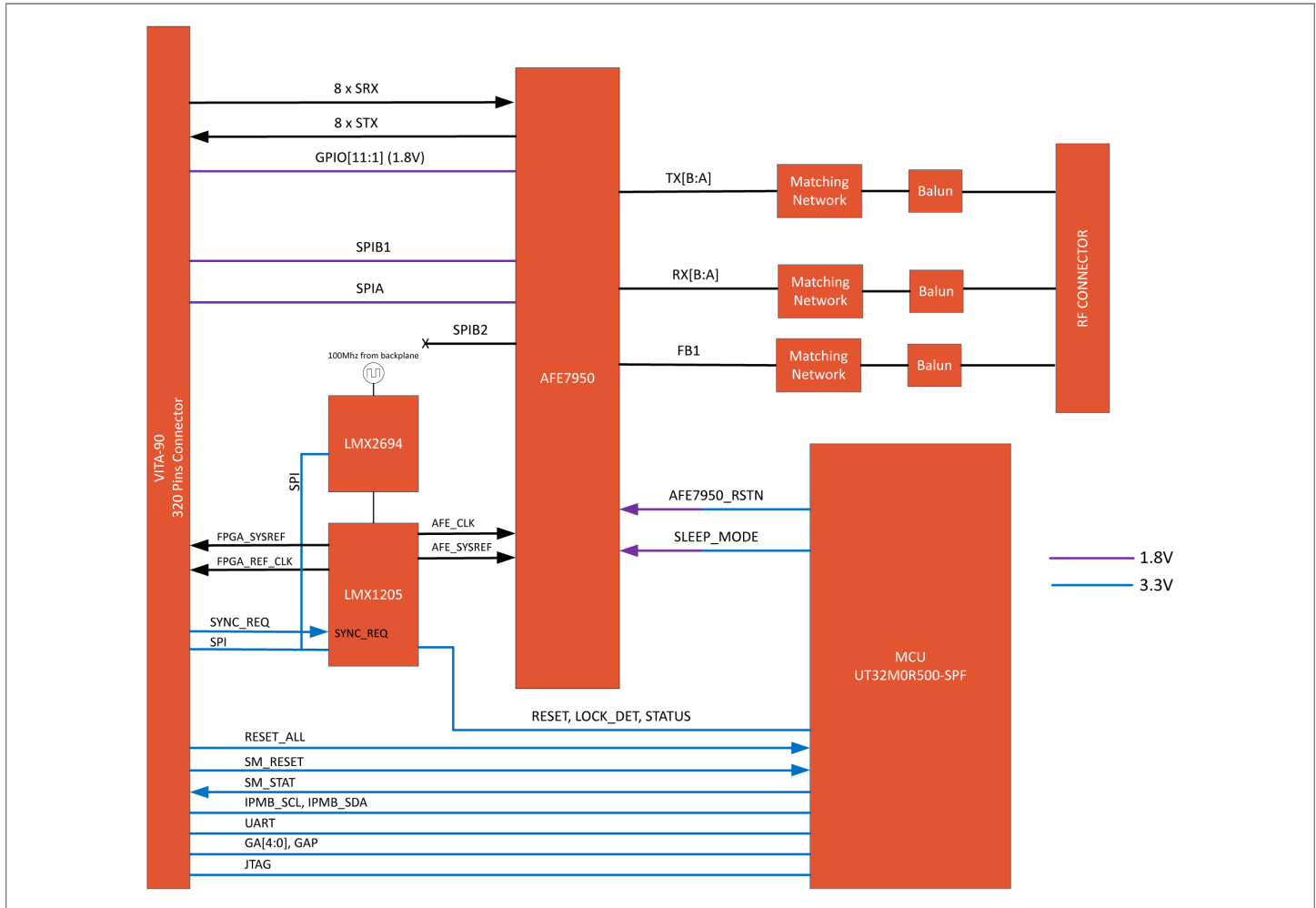
For users, the AIOM-VNXP simplifies system architectures and shifts complexity into software, enabling faster updates and scalability. Its multi-band, multi-mission capability supports diverse applications on a single platform, reducing hardware duplication and cost. In-orbit reconfigurability allows adaptation to evolving mission needs, extending operational value. By reducing development time, lowering engineering risk, and delivering high-throughput performance in a compact footprint, the AIOM-VNXP enables satellite primes, commercial space companies, and defense organizations to deploy flexible, scalable, and cost-effective RF systems.

Features

- 650 MHz–8 GHz direct RF digitization
- Dual Rx/Tx plus observation channel.
- 1200 MHz instantaneous bandwidth
- High-Speed Interface: JESD204C data connectivity
- Software-Defined: Reconfigurable digital up/down conversion

Applications

- SDR Payloads and Phased Arrays
- SATCOM: Multi-band communications
- EW: Signal detection and response
- RF sensing and data downlink
- Long-range communications



RF Sampling Transceiver

- TI AFE7950 Integrated RF Transceiver
- Direct RF Sampling (650 MHz – 8 GHz)
- Integrated Digital Up/Down Conversion

Channel Configuration

- 2x ADCs (Receive Channels)
- 2x DACs (Transmit Channels)
- 1x ADC (Observation/Feedback Channel)

Bandwidth & Performance

- 1200 MHz Instantaneous Bandwidth (Rx/Tx)
- 1200 MHz Observation Channel Bandwidth
- High Dynamic Range, Multi-Band Operation

High-Speed Interfaces & GPIO

- 8x JESD204C SERDES Lanes (Full Duplex)

AIOM-VNXP Analog I/O Module

- 2x SPI (1.8V)
- 11x GPIO (1.8V)

RF & Clock Interfaces

- 2x Rx Coax Inputs
- 2x Tx Coax Outputs
- 1x Rx Feedback Coax
- 1x External Reference Clock Input

Mechanical, Power & Environmental

- VNX+ Form Factor: 89mm x 78mm x 19mm
- -Mass: <388 g
- -Power Dissipation: <21W Max
- -Operating Temp: -10°C to +50°C
- -TID: Up to 30 krad (Si)
- -SEL Immunity: >37 MeV-cm²/mg
- 11x GPIO (1.8V)