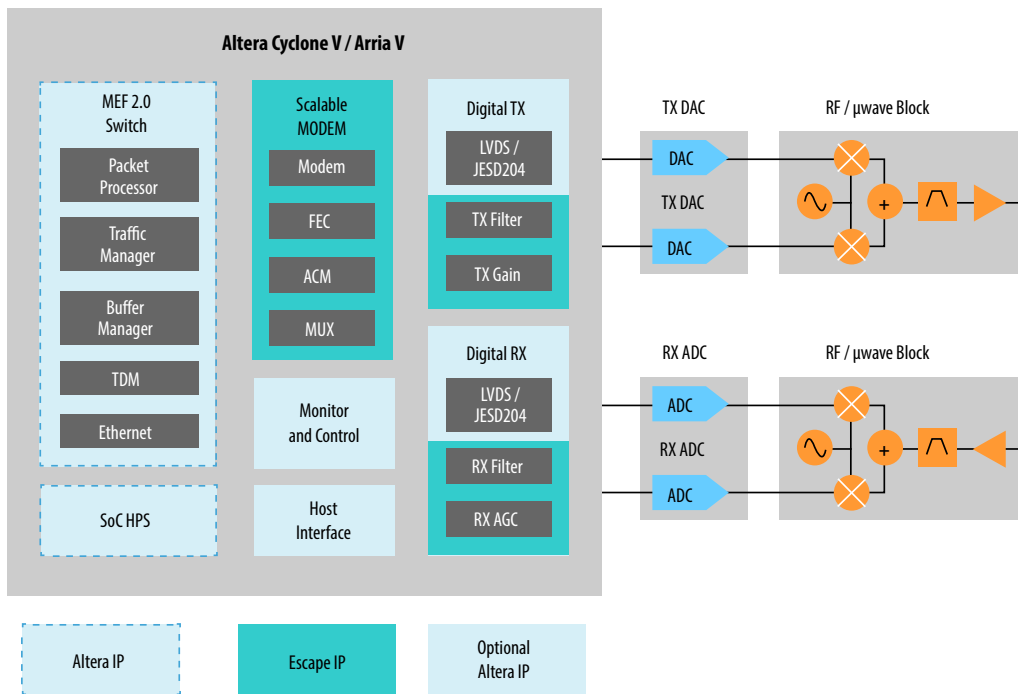


Altera and Escape Communications' Microwave Modem Solution

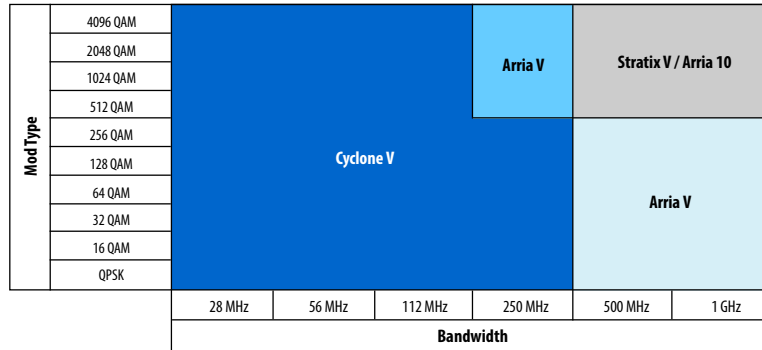
Altera and Escape Communications have partnered to provide a turnkey scalable solution suite for microwave and millimeter-wave backhaul and fronthaul applications based on Altera's Cyclone V and Arria V FPGAs with Escape's microwave modem IP. The modem IP features hitless Adaptive Coding and Modulation (ACM), Forward Error Correction (FEC), adaptive equalization, and a complete field-proven radio management software stack. When combined with Altera's standard IP blocks, SOC devices featuring dual ARM-9 cores, and MEF2.0 certified switch IP, the modem solution provides a complete single-chip mobile backhaul solution that can be scaled to meet a wide range of link capacities supporting megabits to multi-gigabit data rates. The microwave modem solution meets system requirements of traditional microwave backhaul applications and emerging millimeter-wave applications in E and V bands. For example, an E-band link operating in a 1 GHz bandwidth can provide capacities exceeding 5Gbps enabling operators to meet the rapidly evolving backhaul and fronthaul requirements of LTE and LTE-A networks.

System Block Diagram Including Modem Solution and Optional MEF2.0 Ethernet Switch



The modem operates from QPSK to 4096 QAM and from 3.5 MHz to 1 GHz RF bandwidth and is scalable with customers selecting the best FPGA for the application. Lower capacity systems could use the Cyclone V FPGA while higher capacities the Arria V FPGA. Ultra high-capacities could use the Stratix V or upcoming Arria 10 devices.

Typical FPGA Device Family Used as a Function of Modulation Type and Bandwidth



Altera offers MEF 2.0 certified switch based on Altera's Triple-Speed Ethernet MegaCore function providing > 5Gbps capacity. Altera Ethernet switch IP when incorporated with the Escape modem IP solution provides a single chip mobile backhaul solution.

Key Modem Features	Key FPGA / Altera IP Features
<ul style="list-style-type: none"> • QPSK to 4096 QAM • 3.5 MHz to 1 GHz BW • Hitless Adaptive Coding and Modulation (ACM) • Standard and Enhanced Forward Error Correction (FEC) • Cross-polarization cancellation (XPIC) • Adaptive equalization • SYNC-E and IEEE 1588V2 support • Configurable phase noise and phase hit mitigation • Frequency tracking • IQ imbalance compensation • Complete field-proven radio management software stack <ul style="list-style-type: none"> – HTML GUI – SNMP client – Extensive diagnostics application – Applications, libraries, and drivers 	<ul style="list-style-type: none"> • Scalable from Cyclone V to Arria V and Stratix V • ARM Hard Processor System (HPS) • JESD204B and LVDS data converter support • Carrier grade Ethernet Switch MEF 2.0 available including <ul style="list-style-type: none"> – > 5Gbps Capacity – Full L2 control protocol handling as specified by MEF – 1588V2 support – Sync E support – TDM interface – XAUI Interface

Want to Know More?

Visit our website or call your local Altera sales representative today to learn more about how Altera FPGAs can help you enable your microwave backhaul.

www.altera.com/end-markets/microwave-backhaul

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