Arctic Sound-P Product Family Heatmap / What to Expect Guide

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Notes

- Public release notes for oneAPI available here: https://software.intel.com/content/www/us/en/develop/articles/intel-oneapi-toolkit-release-notes.html
- Intel® oneAPI section will cover differences from public release (above) using Arctic Sound-P NDA release
- All other Arctic Sound-P documentation is in IRC: https://registrationcenter.intel.com/en/products/ (after registering with the following link once to get access approval https://registrationcenter.intel.com/en/forms/?productid=3476).
- This document centers on features and functionality; it does not cover performance targets.

Definitions (1/2)

- **A1**: Refers to any hardware native features or components of ATS-P A1 SDV cards.
- **Alpha**: Refers to any software native features or components in the Alpha software release.
- **B0**: Refers to any hardware native features or components of ATS-P B0 SDV cards and implies a pairing between B0 cards & Alpha software.
- **Beta**: Refers to any software native features or components in the Beta software release; implies a B0 cards + Beta software combination.

Definitions (2/2)

- Color-coding table
  - Green: Fully Functional – no known sightings impacting Si or SW functionality
  - Yellow: Partially Functional – sightings impacting Si or SW functionality. Details captured in notes
  - Red: Not Functional – not functional on Si & SW. Details captured in notes
  - Grey: Not Available – feature not supported on ATS-P

Fully Functional	Partially Functional	Not Functional	Not Available

Arctic Sound-P Test Capability (1/4)

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0	Beta	Notes
Memory	Known RAS bugs (boot PPR, PCLS) to be fixed in B0.		RAS PPR, PCLS bug fixes verified on B0. PPR FW enabling in progress		Trained at 2.8 GT/s on 2T, Performance modes, Power Management, RAS, Electrical Validation , Stress Validation; known memory bandwidth limitation affecting performance – please refer to the performance guide
PCIe	Known compliance failures on A0. Receiver Errors and corner case Surprise Link Down issue under debug		No known functional issues on B0. Receiver and link down issues resolved. PCI Express* (PCIe*) register compliance (CV4 test suite) issues exist. Incorrect register attributes.		Data integrity, Link Power management, Link stability, Compliance, Stress Validation, Electrical Validation
MDFI	Pending Validation with Slow/Fast parts. Need more execution hours for stress validation		MDFI interface fully validated. Meeting spec margins.		Trained at 2.8 GT/s, Data integrity Validation, Electrical Validation, Stress Validation. Performance monitoring is broken.

Arctic Sound-P Test Capability (2/4)

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0	Beta	Notes
Reset	Unbind hangs during unbind /FLR/bind				Cold Reset, Warm Reset, S3/S4/S5, FLR
Security					CSC, DRNG
Concurrency	SW WA in place for PCIe deadlock bug. Synthetic stress failures under debug		PCI Express* (PCIe*) deadlock fix verified on B0. All stress testing completed on A-Step, WIP on B0.		Stresses PCIe, Memory, MDFI, PM, RAS flows concurrently
GPU IP	GPU hangs when software uses atomic compare-and-exchange		Same as A step – SW WA Available		Multi Context, Systolic, Compute Atomics, Large GRF, Bfloat, Copy Host to Local memory

Arctic Sound-P Test Capability (3/4)

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0	Beta	Notes
Power Management	No issues with 1T RC6. 2T RC6 corner case issue under debug.		2T RC6 bug fix verified on B0. PMAX enabled.		RC6, Power Budgeting, P-States, Thermal, Converged Telemetry checkout, PMAX
Other functional features	Known bugs to be fixed in B0 for 2T		SRIOV B0 bug fix verified Supporting programmable media functionality		SRIOV, Reset, FLR, Clock Gating, Power Gating, GV/CPD, Decode, Encode, Transcode, Media Reset
Power/Performance	Asymmetric config Thread dispatcher bug to be fixed in B0.				Asymmetric config (448/480EU); HBM memory efficiency
Interoperability				Support targeted for future software release	External Fabric Support, InfiniBand Fabric Support

Arctic Sound-P Test Capability (4/4)

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0	Beta	Notes
PCI Express* (PCIe*) bandwidth test					There are multiple levels of workarounds for A1 parts implemented in the software stack, please check Arctic Sound Software release notes for more details.
RC6					
Atomic compare-and-exchange					Workaround: Insert a memory read operation in the atomic polling loop of every thread, so that a bubble is created that enables the instruction cache miss request to complete.
IFWI OS Command Line Tool Update					
AMC OS Command Line Update Tool					
Host IFWI update					Host system BIOS update
Tile 0 performs better than Tile 1			Not tested yet		Older KMD had page tables for HBM residing on Tile 0, leading to better performance when running on Tile 0 vs. Tile 1. Plan to test on B0
Memory allocation limited to 4GB			Not tested yet		Workaround for OpenMP offload: -fopenmp-targets=spir64 -Xopenmp-target-linker “cl-intel-greater-than-4GB-buffer-required”
Advisor Multi-tile profiling support			Not tested yet		Advisor currently only profiles Tile 0
VTune Multi-tile profiling support			Not tested yet		For implicit scaling, all tasks currently attributed to Tile 0
oneMKL Level 2 and 3 BLAS routines on L0			Not tested yet		Workaround: use OpenCL backend
GDB Tool					Targeted for Beta

Gfx SW Test Capability

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0 + Alpha 1	Beta	Notes
Ultra Low Latency Submissions (ULLS)					Alpha+ SW will need environment variable to enable. Beta SW will have it as default
Multi-tile L0 implicit scaling					Concurrent kernel can't be executed with implicit scaling
OCL multiple devices support					Env variable needed to enable: EnableMultiRootDeviceContexts=1. known corner case functional and performance bugs.
SRIOV			All HW bugs fixed		
EU Debugger			HW supports debug of single context		L0 based tech preview only

Intel® oneAPI Toolkits Test Capability

Fully Functional	Partially Functional	Not Functional	Not Available

Card Areas	A1	Alpha	B0 + Alpha 1	Beta	Notes
Base Toolkit				Performance optimizations	
- Vtune*					The NDA build supports Arctic Sound
- Advisor	1T	1T	1T		2T support will be added in Beta.
- MKL					
- Intel Distribution of GDB					A1 has HW bug. B0 has functional fix for debugger but not for performance.
- DPC++					DPCT is available for customers to migrate their code to DPC++.
HPC Toolkit				Performance optimizations	
- Ice Lake					
- IFX					https://software.intel.com/content/www/us/en/develop/articles/fortran-language-and-openmp-features-in-ifx.html
- MPI					
AI/Analytics Toolkit				Performance optimizations	
- Intel® Optimization for PyTorch*					
- Intel® Optimization for TensorFlow*					
- Intel® Low Precision Optimization Tool					Q4 will have the GPU support in v1.6
Open Vino				Performance optimizations	The full support would be added in 2022.1 in Q4.


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