



PEPPER JOBS

GLK-UC2X

Introduction presentation

Rev 1.0, December 2018

About Pepper Jobs

Founded in 2017 by a group of customer-focused gadget enthusiasts and engineers, Pepper Jobs aims to become one of the world's leading computing and mobile gadgets companies.

To achieve this goal, Pepper Jobs has been developing a wide variety of innovative gadgets with cutting-edge technologies and delivering them to our customers at an affordable cost. Through these products, Pepper Jobs strives to unparalleled satisfaction and reliability to consumers.

Mr. Ken Wong, General Manager of Pepper Jobs, was formerly MINIX's product director and defined many innovative products such as 780G-SP128M (world's 1st mini-ITX motherboard that supports 1080p HW decoding), NEO-X series Android media hubs, NEO-Z series Intel-based mini PCs, and many other PC gadgets such as USB-C hubs & smart remote controllers.

GLK-UC2X is the 1st mini PC designed and released by Pepper Jobs targeting small business, 4K home theater and living room use, with low power and great savings on electric bill.

Major improvements of GLK over APL

FEATURES	APOLLO LAKE	GEMINI LAKE	ADVANCEMENTS
 CPU	Goldmont Core, 2M cache 31 x 24 Package	New Goldmont Plus core, 4M cache 25x24 package	✓ Better CPU perf and board area savings
 Graphics and Display	Gen 9 Graphics Gen 9 Display	Gen 9 Graphics Gen 10 Display	✓ Next Gen Display Engine with new features
 Media	VP9 (8b dec) HEVC (10b dec/8b enc)	VP9 (10b dec/8b enc) HEVC (10b enc)	✓ Fast and low power media transcode
 Memory	DDR3L 1867 MHz LPDDR4 2400MHz LPDDR3 1867	DDR4 2400 MHz LPDDR4 2400MHz	✓ Lower BOM Cost Options and better memory bandwidth

- ▶ Performance enhancements
- ▶ 2M cache -> 4M cache
- ▶ Gen 9 display -> Gen 10 display
- ▶ 8-bit VP9/HEVC decode -> 10-bit VP9/HEVC decode
- ▶ DDR3L SODIMM -> DDR4 SODIMM support

Unique Features of GLK-UC2X

- ▶ TDP Unlocker
- ▶ Superb heatpipe cooling system
- ▶ Support 3x 4K displays @ 60Hz
- ▶ Dual USB-C ports
- ▶ Easy DIY upgradability

“The King of Celeron”

TDP Unlocker

- ▶ 6W TDP limits the performance of the 8th Gen Quad Core N processors
- ▶ Frequencies (CPU/GPU) drop whenever TDP reaches 6W
- ▶ TDP unlocker increases the TDP threshold
- ▶ TDP unlocker enhances system performances by avoiding under-clocking instead of over-clocking, thus 100% safe
- ▶ Performance can be +70% better than competitions with the same processor which frequently down-clock to 1.4GHz or below under load due to poor cooling
- ▶ Pre-requisite: GOOD COOLING is required to handle the extra power
- ▶ Pepper Jobs overcame this issue by the heat pipe cooling system

Heatpipe Cooling System

- ▶ Extreme silent operation at 100% CPU load
- ▶ Effectively dissipates heat out of the casing
- ▶ Design ready to handle >15W TDP CPU
- ▶ No CPU throttling under 100% load for 24hrs
- ▶ No frequencies drop under load



With TDP unlocker & good cooling

The screenshot displays a Windows 10 desktop environment with several monitoring and testing applications open. On the left, three panels show movie stills with the text "I can do this all day." The main desktop area contains the following windows:

- HWMonitor v5.00-3550 Sensor Status:** A table showing various system sensors. The CPU clock speeds for all four cores are circled in red, showing a value of 2,300.0 MHz.
- HWiNFO64 v6.00-3550 Sensor Summary:** A detailed system summary window. The "Computer Name" field is circled in red and shows "DESKTOP-PIKOC5M". A small CPU usage graph in the top right corner also has a red circle around the 2300 MHz mark.
- Task Manager:** The "Performance" tab is active, showing the CPU is running at 100% utilization and 2.30 GHz. The "2.30 GHz" value is circled in red.
- AIDA64 System Stability Test (Trial Version):** A stress testing application window. The text "TRIAL VERSION" is prominently displayed in the center of the test area, circled in red.

The taskbar at the bottom shows the system clock at 4:20 PM on 11/6/2018.

Without TDP unlocker & poor cooling condition

- ▶ CPU drops to 1.4GHz within 15 seconds of loading, e.g.: Bxxxxxk S2

The screenshot displays a Windows 10 desktop with several monitoring windows open. The HWINFO64 window shows the following data:

Sensor	Current	Minimum	Maximum
CPU (F0): Intel Celeron N4100			
Core #0 VID	0.880 V	0.720 V	1.195 V
Core #1 VID	0.880 V	0.720 V	1.195 V
Core #2 VID	0.880 V	0.720 V	1.195 V
Core #3 VID	0.880 V	0.720 V	1.195 V
Core #0 Clock	1,999.8 MHz	699.9 MHz	2,399.7 MHz
Core #1 Clock	1,999.8 MHz	699.9 MHz	2,399.7 MHz
Core #2 Clock	1,999.8 MHz	699.9 MHz	2,399.7 MHz
Core #3 Clock	1,999.8 MHz	699.9 MHz	2,399.7 MHz
Bus Clock	100.0 MHz	100.0 MHz	100.0 MHz
Uncore Clock	100.0 MHz	66.7 MHz	66.7 MHz
Core #0 Usage	100.0 %	4.4 %	100.0 %
Core #1 Usage	100.0 %	0.7 %	100.0 %
Core #2 Usage	100.0 %	1.4 %	100.0 %
Core #3 Usage	100.0 %	4.4 %	100.0 %
Total CPU Usage	100.0 %	3.5 %	100.0 %
Ch Demand Clock Modulation	100.0 %	100.0 %	100.0 %
Ch #0 Ratio	15 x	7 x	24 x
Ch #1 Ratio	15 x	7 x	23 x
Ch #2 Ratio	15 x	5 x	24 x
Ch #3 Ratio	14 x	8 x	24 x
Uncore Ratio	40 x	40 x	40 x

The Task Manager window shows the CPU at 100% utilization and 1.43 GHz. The System Stability Test window shows a 15-second elapsed time. The HWINFO64 window also shows the CPU at 1.10 GHz. The System Information window shows the computer name as DESKTOP-QN6L10 and the computer brand name as AZW S II.

CPU Performance

- ▶ Could be **100%** better under load than products without TDP Unlocker (same processor)
- ▶ Multi-Core performance is similar as Core™ i3-7100u's (Ref: Cinbench, GeekBench)



Bxxxxxk S2 @ eMMC
Onboard LPDDR4-2133



GLK-UC2X @ eMMC
Single Channel DDR4-2400
TDP Unlocker enabled

Ludashi v5.15 test result, GLK-UC2X scores 1.8 times higher with the same CPU

CPU Performance (cont'd)



GLK-UC2X @ m.2 SSD
(Celeron N4100)



Mxx Cubi 2 @ m.2 SSD
(i3-7100u)

Multi-Core performance is similar as Core™ i3-7100u's
(Ref: Cinbench R15, GeekBench 4, Ludashi v5.15)
i3's GPU (a separate core) performs much better though

CPU Performance (cont'd)

Your System

Processor: Intel Core i3-7100U CPU
Cores x GHz: 2 Cores, 4 Threads @ 2.40 GHz
OS: Windows 8, 64 Bit, Professional Edition (build 9200)
CB Version: 64 Bit
GFX Board: Intel(R) HD Graphics 620

Ranking

CPU	Score
1. 12C/24T @ 2.66 GHz, Intel Xeon CPU X5650	1279
2. 6C/12T @ 3.30 GHz, Intel Core i7-3930K CPU	1096
3. 4C/8T @ 4.40 GHz, Intel Core i7-4770K CPU	822
4. 4C/8T @ 3.40 GHz, Intel Core i7-3770 CPU	662
5. 4C/8T @ 2.60 GHz, Intel Core i7-3720QM CPU	590
6. 4C/8T @ 2.79 GHz, Intel Core i7-3840QM CPU	505
7. 4C/4T @ 1.10 GHz, Intel Celeron N4100 CPU	260
8. 2C/4T @ 2.40 GHz, Intel Core i3-7100U CPU	257
9. 2C/4T @ 1.70 GHz, Intel Core i5-3317U CPU	214

Geekbench Browser

Pepper Jobs GLK-UC2X

Single-Core Score: 1830
Multi-Core Score: 5556

Geekbench 4.2.3 Tryout for Windows x86 (64-bit)

Result Information

Upload Date: October 22, 2018 07:13 AM
Views: 2

System Information

System Information	
Operating System	Microsoft Windows 10 Pro (64-bit)
Model	Pepper Jobs GLK-UC2X
Motherboard	Pepper Jobs GLK-UC2X
Memory	7570 MB -1MHz
Northbridge	Intel ID31FD 03
Southbridge	Intel ID31EB 03
BIOS	American Megatrends Inc. 5.13
Processor Information	
Name	Intel Celeron N4100
Topology	1 Processor, 4 Cores
Identifier	GenuineIntel Family 6 Model 122 Stepping 1
Base Frequency	1.10 GHz
Maximum Frequency	2.28 GHz
Package	
Codename	
L1 Instruction Cache	32.0 KB x 4
L1 Data Cache	24.0 KB x 4
L2 Cache	4.00 MB x 1

Geekbench Browser

Micro-Star International Co., Ltd. KBL-U Pro Cubi2 (MS-B142)

Single-Core Score: 2768
Multi-Core Score: 5055

Geekbench 4.2.3 Tryout for Windows x86 (64-bit)

Result Information

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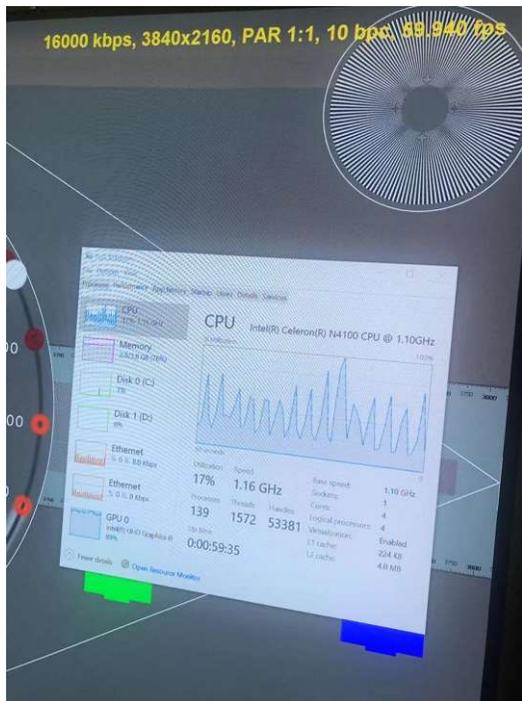
System Information

System Information	
Operating System	Microsoft Windows 10 (64-bit)
Model	Micro-Star International Co., Ltd. KBL-U Pro Cubi2 (MS-B142)
Motherboard	Micro-Star International Co., Ltd. MS-B1421
Memory	8192 MB DDR4 SDRAM 1064MHz
Northbridge	Intel Kaby Lake 02
Southbridge	Intel Kaby Lake-Y PCH 21
BIOS	American Megatrends Inc. 8.60
Processor Information	
Name	Intel Core i3-7100U
Topology	1 Processor, 2 Cores, 4 Threads
Identifier	GenuineIntel Family 6 Model 142 Stepping 9
Base Frequency	2.39 GHz
Maximum Frequency	2.39 GHz
Package	Socket 1356 FCBGA
Codename	Kaby Lake-U/Y
L1 Instruction Cache	32.0 KB x 2
L1 Data Cache	32.0 KB x 2
L2 Cache	256 KB x 2
L3 Cache	3.00 MB x 1

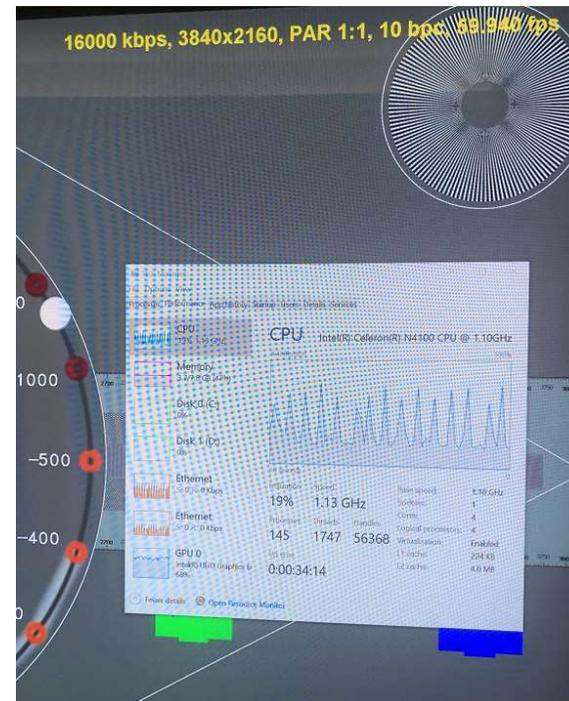
Multi Core performance is comparable with 7th Gen i3

CPU Performance (real life impact)

- ▶ Netflix 4K app requires sustainable CPU/GPU frequencies to play smoothly
- ▶ With TDP unlocker, Netflix 4K is OK even with single channel memory
- ▶ Pepper Jobs recommends dual channel for better GPU margin



Single Channel DDR4 (4GB)
@ 16000 kbps, 4K, 59.940fps



Dual Channel DDR4 (8GB)
@ 16000 kbps, 4K, 59.940fps

CPU Performance (real life impact)

- ▶ Smooth Netflix 4K playback, the first Celeron mini PC that is capable of doing so



3DMARK stress test passed

The screenshot displays a Windows 10 desktop with the 3DMark Advanced Edition application open. The main window shows the results of a Time Spy Stress Test, which has passed with a score of 99.4%. A validation warning is visible, indicating that the system's performance is stable and consistent under load. The CPU-Z window is also open, providing detailed system information.

3DMARK Advanced Edition

HOME | BENCHMARKS | STRESS TESTS | RESULTS | OPTIONS

99.4% PASSED

Time Spy Stress Test

A high score means your PC's performance is stable and consistent under load. To pass the test, your system's frame rate stability must be at least 97% and all loops must be completed.

Validation warning

PASSED: Time Spy Stress Test v2.0 | LOAD | SAVE | COMPARE RESULT ONLINE

Frame rate stability: 99.4% | Number of loops: 20

System information | SHOW DETAILS

GPU	Intel(R) UHD Graphics 600	CPU	Intel Celeron N4100	Time	2019-10-22 18:34 +08:00
SystemInfo	v5.13.690	GUI	v2.6.6174.984		

CPU-Z

Manufacturer: Pepper 300s
Model: GLK-LC2X (To be filled by O.E.M.)
Chipset: Intel Gemini Lake Host Bridge Rev. 03
Southbridge: Intel Gemini Lake LPC Bridge Rev. 03
LPCID: ITE IT86 53

Brand: American Megatrends Inc.
Version: 5.13
Date: 09/29/2018

Graphic Interface: Version: PCI Express
Link Width: Max. Supported
Side Band Addressing

CPU-Z ver. 1.86.0.984 | Tools | Validate | Close

Very few mini PCs could pass this stress test.

Triple 4K 60Hz displays

Introducing Gen 10 Display

The image displays four feature cards for the Gen 10 Display. Each card has a blue header and a grey body with a central image and text.

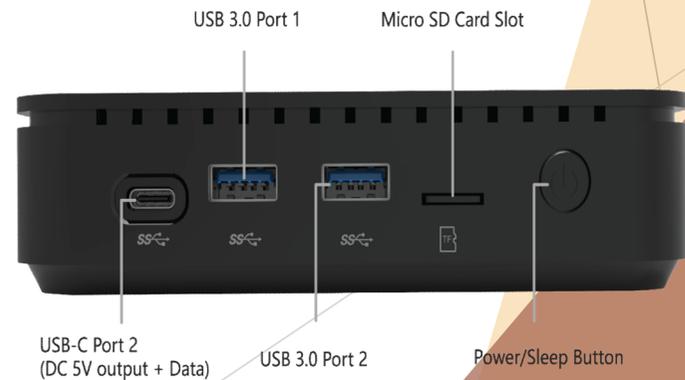
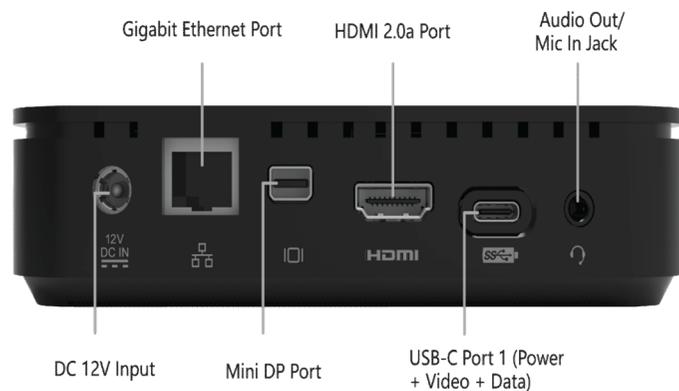
- INTEGRATED HDMI 2.0a**: Shows a computer monitor displaying a game. Text below: **FASTER & LOWER COST**.
- HDCP 2.2**: Shows a baseball game with a lock icon. Text below: **OUTPUT PROTECTED CONTENT TO YOUR TV VIA HDMI**.
- HIGH FIDELITY PREMIUM CONTENT**: Shows the HDMI logo and HDCP 2.2 icon. Text below:
 - 4K/UHD Premium Content
 - Encode and Decode support for 10-bit color
 - HDMI2.0a & HDCP 2.2 for 4K content to external display
- USER GENERATED STREAMS**: Shows YouTube, Google Hangouts, and Chrome logos. Text below:
 - HW Decode/Encode for Google Hangouts, Chrome browser, MS Edge browser, and YouTube
 - Capture and upload 1080p video encoded in HEVC 10bit

- ▶ GLK-UC2X supports up to **3x** 4K video outputs @ **60Hz**
- ▶ It's a breakthrough for entry level mini PC
- ▶ 1 x HDMI 2.0a output
- ▶ 1 x mini DP output
- ▶ 1 x USB-C output (eDP signal, does not support hot-plug)

Dual USB-C ports

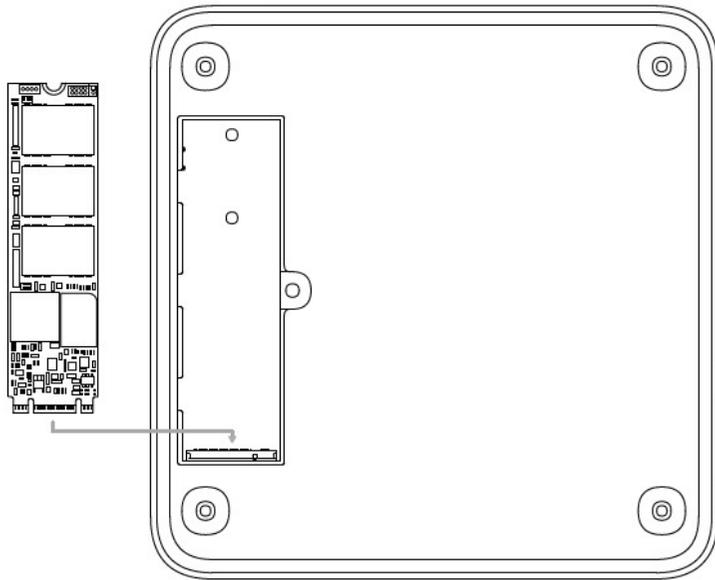
- ▶ GLK-UC2X comes with 2 USB-C ports
- ▶ USB-C port 1 support PD power input, 4K video signal & data
- ▶ USB-C port 2 support data only
- ▶ Both USB-C ports are fully compatible with Pepper Jobs TCH series of hubs (TCH-1/2/3/4/5/6/U4)

P.S. USB-C port 1 utilizes the eDP channel, and therefore it does not support video hot-plug & audio signal (characteristics of eDP).

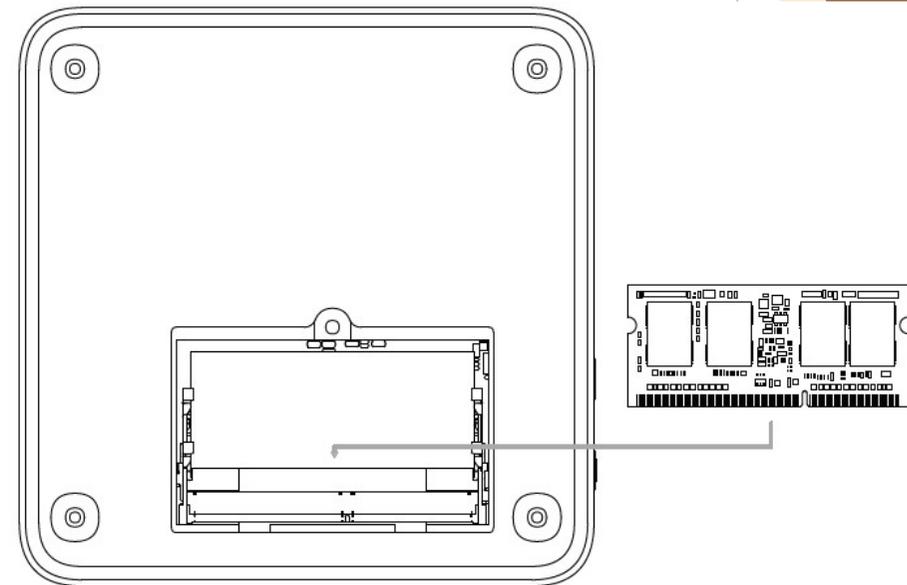


Easy DIY upgradability

- ▶ Separate covers for m.2 SATA SSD & DDR4 SODIMM upgrade
- ▶ Very easy to operate



NOTE: NVMe M.2 SSD is not supported



NOTE: GLK-UC2X supports 1 x 8GB DDR4 SODIMM (single-channel), or 2 x 4GB DDR4 SODIMM (dual-channel)

Thank you!!

