ZimaBlade Benchmarking

First as caveat.

This is based on a preproduction ZimaBlade, full mass production may see changes to the hardware, these may only be slight but could see different results.

Apologies for the moire noise in the images when taken by a phone.

Hardware Used.

ZimaBlade ZBB001-BK400032 (aka ZimaBlade Quad Core 7700)

8GB Memory (supplied by IceWhale with the Blade)

500GB Crucial SSD, fresh Windows install can take 25-30GB so I didn't use the eMMC. This is shown as **Windows Boot Manager** in the BIOS images as it had a copy of Windows son it that was erased.

64GB USB Flash Drive This appear as a UEFI: Generic Mass Storage in the BIOS Images.

There are "lite" builds that can reduce the requirements of Windows, but this test was using a Stick Windows install. The lightweight builds often trim out components that maybe put back later by updates.

The aim of the tests was to give an idea what the stock hardware was capable of as a lightweight desktop. In both cases I took the Win 10/11 Pro version. Please remember this is on the bare metal, if you were to virtualise Windows the virtualisation software would need to use some CPU and memory for its own use..

IMPORTANT: ZimaBlade hardware is not sold with a licence for Windows, if you wish to use Windows long term you will need to purchase a licence.

There are many sources of "cheap" licences often claiming to be from OEM PC's that have been disposed of by corporations. The cost of Windows 11 is about £120 for Windows 11 Home, and around £220 for Windows 11 Pro. Websites where cheap Windows keys are available are unlikely to be genuine. These "cheap" usually come from different sources with common sources being grey imports, MAK or KMS keys, OEM key, Used keys, Keys for Student & other groups and of course pirated / KeyGen versions.

Without dwelling on the legality of these keys, be aware that Microsoft can (and do) periodically block entire ranges of keys known to have been leaked online or sold many times over forcing the Windows install to de-activate. If you use a key sourced from one of these cheaper sellers, it may work for years, but could easily fail in a few months.

Windows 10.

Install:

Windows 10 was installed by creating a boot USB using the Microsoft Windows Creation tool. My USB was 64GB and known to work to boot. Not all USBs will be bootable on ZimaBlade / Board, if you cannot boot from the USB you use, try a different one. Generally branded ones are more reliable than generic USB devices to boot but this isn't always the case.

The USB was plugged onto the USB A socket and ZimaBlade was booted into the BIOS (press and hold **DEL** on power on to get into the BIOS) and the boot order changed so it booted to the SSD not the eMMC - Highlighted in Red, This Configuration was then saved (F10 - Green Box) but the BIOS NOT exited.



The ZimaBlade was then told to do a one-time boot to the USB device in white so we can proceed with the install.

Main	Ag Advanced	Chipset	Security	Boot	Save	& Exit	Aller Ica
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Installation proceeded like a normal Windows Install, and I opted to do a Clean Install erasing the prior content of the SSD. Installation took 20-30 minutes from a USB stick to a SSD.

Nothing was needed to be done to the install to ensure that it proceeded other than a usual install so that means selecting the W10 build type, entering a key if you have one, and specifying username, password, country and so on.

Once booted System About and Device Manager were opened and the status of the install reviewed. There were three Yellow indicators where hardware was not in the build.

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protected.	A CONTRACTOR OF A CONTRACTOR O	
iee details in W	indows Security	Computer 👘 👘
	A CONTRACTOR OF	📂 🔰 👝 Disk drīves
Device spec	rifications	Display adaptors
server spec		Firmware 📔
Device name	DESKTOP-46677DI	Human Interface Devices
Processor	Intel(R) Celeron(R) CPU J3455 @ 1.50GHz 1.50 GHz	> 📷 IDE ATA/ATAPI controllers
Installed RAM	8.00 GB (7.85 GB usable)	Keyboards
Device ID	BBA8D11A-3169-4C7D-933E-69CDE69460F5	Mice and other pointing devices
Product ID	00330-80000-00000-AA446	Monitors
System type	64-bit operating system. x64-based processor	Monitors
Pen and touch	No pen or touch input is available for this display	Network adapters
PROPERTY.		V V Other devices
Сору		M PCI Simple Communications Controller
All and a second second		SM Bus Controller
Rename this	PC	Muknown device
		Portable Devices
Windows s	pecifications	> 🚍 Print queues
Edition	Windows 10 Pro	Processors
Version	22H2	SD host adapters
Installed on	14/11/2023	Software devices
OS build	19045.2965	> 🙀 Sound, video and game controllers
Experience	Windows Feature Experience Pack 1000.19041.1000.0	> Storage controllers
Сору		> 🏣 System devices
		> Universal Serial Bus controllers
-		

The Undetected Devices were:

- PCI Simple Communication Controller VEN 8086 PCI 5A9A
 - Intel Trusted Execution Engine
- SM Bus Controller VEN 8086 PCI 5AD4
 - Intel SMBus Controller
- Unknown Device VEN ANX PCI 7447
 - $\circ \quad \text{USB C Controller Chip} \\$

I had already decided to perform a Windows Update to bring the device right up to date before running PassMark. I opted to take all updated including the optional ones, and as part of that all drivers were installed by Windows Update. The update needed two reboots however depending on when you do this and how old the W10 image is, you may need more or less reboots.



The final steps were to install PassMark Software, (https://www.passmark.com/) and CoreTemp (<u>https://www.alcpu.com/CoreTemp/</u>) to test and help with the testing and monitoring

Testing

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Core lem	Core Temp 1.18.1				×		
File Options Tools Help							
Select CPU: Processor #0 V 4 Core(s) 4 Thread(s)							
Processor In	formation						
Model:	Intel Celeron J	3455 (Ap	ollo Lake)				
Platform:	Socket 1090 (F	CBGA 10	90)				
Frequency:	2197.64MHz (9	99.89 x 2	2.0)				
VID:	1.2050 v		Modulatio	n:			
Revision:	B0	Li	ithography: 14 nm				
CPUID:	0x506C9		TD	P: 10.0	Watts		
Processor #0): Temperature	Readings					
Power:	8.6W	5.2W	<0.1W	3.3W	1.3W		
Tj. Max:	105°C		Min.	Max.	Load		
Core #0:	70°C		62°C	76°C	65%		
Core #1:	70°C		62°C	76°C	88%		
Core #2:	69°C		62°C	76°C	65%		
Core #3:	69°C		62°C	76°C	60%		

CoreTemps was installed as The Windows Update was running and allowed me to record a range of temps as the updates installed.

As can be seen the system topped out at about 76*C while updates were installing.

After that PassMark was allowed to run and CoreTemp was asked to log the temperatures power and CPU speed. As you may expect as PassMark ran the CPU cores switched states (Grey line Left Axis) mainly in the 2200Mhz mode, but dropping to 800Mhz at times, temperature (Blue Line Right Axis) spiked as the test was run and Power (Orange Line Right axis) varied as test were run. Nothing out of the ordinary was really seen.



Pass Mark results

ZimaBlade IS NOT a hardcore gaming device and it would be unrealistic to expect high PassMark scores, this is after a small cheap single board computer. In addition, I have not included the 3D Graphics, Memory or Hard Drive scores.

The CPU is an intel Embedded GPU and while can do basic 3d operation. It can handle light "work" type roles such as CAD spreadsheets and presentations but is not intended for gaming or advanced graphics.

The CrowdSupply kits came in different options, some had no memory, some 8GB and some 16GB, the memory in my sample may not be the same model as the memory sent to crown supply backers, or future orders.

The SSD is also not part of any kit, and disk access times will vary according to the type of hard drive you use.

IceWhale had advertised a Passmark CPU Mark of 2238 points and mine is slightly higher bit that may be experimental error.

PASSMARK 555 4th Percentile RERUN CPU MARK	PassMark Rating RERUN	2244 CPU Mark RERUN 83 2D Graphics Mark RERUN	319 30 Graphics Mark RERUN 10111 Memory Mark RERUN	4320 Disk Mark RERUN			
ERUN CD MARK 83 Sth Percentile	2244 CPU Mark RERUN	10139 Integer Math RERUN 3059 Floating Point Math RERUN	5.6 Prime Numbers RERUN 970 Extended Instructions (SSE) RERUN	33690 Compression RERUN 1481 Encryption RERUN	Physics RERUN 4694 Sorting RERUN	734 CPU Single Threaded RERUN	*
RERUN 3D MARK 319 10th Percentile RERUN	83 2D Graphics Mark RERUN	Simple Vectors RERUN 100 Fonts and Text RERUN	RERUN Interface RERUN 186 Image Filters RERUN	4.9 Image Rendering RERUN 5.4 Direct 2D RERUN	PDF Rendering RERUN 10 Direct 2D - SVG RERUN		

Windows 11.

No Hardware changes, other than the USB now has W11 install software on it.

Install:

Windows 11 was installed by creating a boot USB using the Microsoft Windows Creation tool. The same 64GB USB was used as it was known to work to boot.

As before the USB was plugged onto the USB A socket and ZimaBlade was booted into the BIOS (press and hold **DEL** on power on to get into the BIOS) and the boot order changed so it booted to the SSD not the eMMC - Highlighted in Red, This Configuration was then saved (F10 - Green Box) but the BIOS NOT exited.

Main Advanced Chipset S	ecurity Boot Save & Exit	
Boot Configuration Setup Prompt Timeout Bootup NumLock State Full Logo Show CSM Support Boot option filter Storage Video Other PCI devices Boot Option Priorities	1 [On] [Enabled] [Enabled] [UEFI only] [UEFI] [Enable] [UEFI]	Sets the system
Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 New Boot Option Policy	(Rindows Bopt Manage] Lucolan (MMC - BJTD4R)] [debian (MMC - BJTD4R)] [UEFI: Generic Mass] [Default]	++: Select Screen TJ: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F10: Save & Exit

The ZimaBlade was then told to do a one-time boot to the USB device highlighted in White so we can proceed with the install.

Main	Advanced	p tio Setup I Chipset	Utility - Security	Boot	Save	& Exit	Hiller	ICai
Save (Save) Disca	Options Changes a Ind Change	nd Exit s and Exit						
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Boo deb del Wi	ot Overrido oian (MMC bian (MMC ndows Boot FI: Generi	e - BJTD4R) - BJTD4R) Manager (MM r Mass Store	1C – BJTD4R) age 1100. Ps	artitio	n 1			E H F F
La	aunch EFI S	Shell from f:	ilesystem de	evice				F

Bypassing TPM

Windows 11 has stricter requirements than Windows 10 and to ensure an install they needed to by bypassed. There is more detail on the web, but to do this we need to add a few files to the registry to bypass checks.

When W11 is booted, and you get to the initial screen asking about Language press **SHIFT and F10** to get a command prompt and then type **regedit**.

Navigate to HKEY_LOCAL_MACHINE\SYSTEM\Setup.

Create a new registry key under Setup and name it **LabConfig**. To do this right click in the right Windows and select **NEW** > **KEY**)

Double Click on the new Key to go into the LabConfig key , and create **DWORDs** values called **BypassTPMCheck** , **BypassSecureBootCheck** , **BypassRAMCheck**. Again this is done by right clicking in the right windows and selecting NEW . DWORD (32-Bit) Value.

Once created double click each key and set the value to **1** The example below shows one set and a new **DWORD** being created.

📑 Registry Editor				- • 🐼
File Edit View Favorites Help				
Computer\HKEY_LOCAL_MACHINE\SYS	TEM\Setup\LabConfig			
✓	Name	Туре	Data	
	(Default) BypassTPMCheck	REG_SZ REG_DWORD	(value not set) 0x00000001 (1)	
SAM	New	2 Key		
> SECURITY		String Valu	e	
SYSTEM		Binary Valu	le	
> ControlSet001		DWORD (3	2-bit) Value	
> CurrentControlSet		OWORD (6	4-bit) Value	
> DriverDatabase		Multi-Strine	a Value	
> HardwareConfig		Emandahl	e String Value	
> Keyboard Layout		Expandable	e string value	
MountedDevices				
> KesourceManager				

Close regedit and the command prompt. Then continue with the Windows 11 installation as normal, so that means selecting the W11 build type, entering a key if you have one, and specifying username, password, country and so on.

I again opted to do a Clean Install erasing the prior content of the SSD. Installation again took 20-30 minutes from a USB stick to a SSD.

Using a local account with Windows 11 as part of the Initial Setup.

Windows 11 likes to be online and tied to a Microsoft Online Account. This has good and bad sides that are beyond this testing.

If you wish to use a Microsoft account, just continue the setup.

If you do not wish to create or use a Microsoft account and would prefer a local account, we need to bypass a few more checks.

When you get to the Windows 10 screen asking for your region remove the ethernet cable.

Once again press **SHIFT and F10** to get a command prompt and then type **OOBE\BYPASSNRO** (note that is oneword) and when you hit return the system will reboot.

Follow the instructions and when you get to the option to connect to a network there will be a small option to the left of NEXT saying "I don't have Internet" click this to continue.

NOTE: This option **DOES NOT** appear if you have not run the **OOBE\BYPASSNRO** command and the install will not continue without a network connection.

Follow the rest of the instructions to create your account and finish the install.

Once booted System About and Device Manager were opened, and the status of the install reviewed. Again, there were three Yellow indicators where hardware was not in the build 1'm not going to include images, but the same three components were without drivers.

- PCI Simple Communication Controller VEN 8086 PCI 5A9A
 - Intel Trusted Execution Engine
- SM Bus Controller VEN 8086 PCI 5AD4
 Intel SMBus Controller
- Unknown Device VEN ANX PCI 7447
 - USB C Controller Chip

To keep the test the same as possible I performed a Windows Update to bring the device right up to date before running PassMark. I again opted to take all updates including the optional ones, and again all required drivers were installed by Windows Update. The update did one reboot however depending on when you do this and how old the W11 image is, you may need more reboots.

The final steps were to install the same software as before namely PassMark Software,(https://www.passmark.com/) and CoreTemp (<u>https://www.alcpu.com/CoreTemp/</u>) to test and help with the testing and monitoring

Testing

🕼 Core Temp 1.18.1 — 🗆 🗙								
File Options Tools Help								
Select CPU: Processor #0 V 4 Core(s) 4 Thread(s)								
Processor In	formation							
Model:	Intel Celeron)3455 (Ap	ollo Lake)					
Platform:	Socket 1090 (FCBGA 109	90)					
Frequency:	2200.44MHz (100.02 x	22.0)					
VID:	1.2050 v	1	Modulatio					
Revision:	B0	Li	ithography: 14 nm					
CPUID:	0x506C9	TDP: 10.0 Watts						
Processor #0): Temperature	Readings						
Power:	10.3W	6.9W	0.0W	3.4W	1.4W			
Tj. Max:	105°C		Min.	Max.	Load			
Core #0:	74°C		51°C	76°C	100%			
Core #1:	74°C		51°C	76°C	100%			
Core #2:	74°C		52°C	76°C	100%			
Core #3:	74°C		52°C	52°C 76°C				

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As can be seen the system again topped out at 76*C while updates were installing.

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Pass Mark results

ZimaBlade as mentioned IS NOT a hardcore rig and it would be unrealistic to expect high PassMark scores, again I have not included the 3D Graphics, Memory or Hard Drive scores for reasons mentioned before.

What did surprise me was that the hardware results were identical, and I did check twice, I expected the CPU result to be the same, but the 2D/3D tests rely to a part on drivers. This may imply that intel didn't re-write driver for W11, merely altered existing ones to un under the new OS.

	SSMARK 555 Percentile RERUN U MARK 2244	PassMark Rating RERUN	CPU Mark CPU Mark RERUN 2D Graphics Mari RERUN	3D Graphics Mar B Graphics Mar RERUN 1 1011 Memory Mark RERUN	9 3 4320 k Disk Mark N RERUN		
2 2 7 to 1	RERUN D MARK 83 Percentile	2244 CPU Mark RERUN	Integer Math RERUN Bioating Point Math RERUN	5.6 Prime Numbers RERUN 970 Estended Instructions (SEE) RERUN	33690 Compression RERUN 1481 Encryption RERUN	Physics RERUN 4694 Sorting RERUN	734 CPU Single Threaded RERUN
3 10th F	RERUN ID MARK 319 Percentile RERUN	83 2D Graphics Mark RERUN	A 3.0 Simple Vectors RERUN A 100 Fonts and Text RERUN	Nindows Interface RERUN 186 Image Filters RERUN	4.9 Image Rendering RERUN 5.4 Direct 2D RERUN	PDF Rendering RERUN A 10 Direct 2D - SVG RERUN	

System Config Report by Belarc

This is from W11 but W10 is almost identical.

B Belarc Advisor - Cor	mputer Profile × +						- 0	×
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About Belarc			Computer I	Profile Summary				•
Software Licenses	Computer Maines : Amabilidade (in MUCKASKUUP) Profile Cafe: 14 Norme 2023 17:01:18 Advisor Version: 12.0							
Usage Missing Undates		Window come: ZimaBardbarr						
USB Storage Use								
Hosted Virtual Machines Network Map Installed Hotfixes Back to Top	Windows 11 Professional (x64) Version 22H2 Install Language: English (United Kingdom) System Locale: English (United Kingdom) Installed: 14/11/2023 14:26:13 Servicing Branch: Current Branch (CB) Boot Mode: UEFI with Secure Boot disable	Operating System (build 22621.2506) d		System Model Enclosure Type: Desktop				
	1.50 gigahertz Intel Celeron 33455 No memory cache 64-bit ready Multi-core (4 total) Not hyper-threaded	Processor ^a		Board: IceWhale Technology C UEFI: American Megatrends Ir	Main Circuit Boan Co.,Ltd. ZBB001-BK40032 ZMB 1.0 nc. 5.12 08/15/2023	d ^b		
	Too 11 Gash to Useful Lond Change Con	Local Storage (mouse over drive name for details)		7.05 Circle too Useble testalle	Memory ^{c,d}			
	433.46 Gigabytes Local Storage Free Space	Size Type Serial Numbe	r Drive# Status*	Slot 'ChannelA-DIMMO' has 8	GB			
	Crucial_CT500MX200SSD1 Samsung BJTD4R	500.11 GB SSD 31.26 GB SSD	0 Healthy 1	8 Gigabytes Maximum System	Memory Capacity			
	USB Attached Drives Generic Mass Storage	64.53 GB	2	c: (NTFS on drive 0)	Local Storage Volu 500.1	11 GB 433.46 GB free		
		* Status reported only for SMART enabled drives		None debasted	Network Storage Vo	lumes		
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