HDWR 1700 Lab 4 - Processors

Nicolas Castellano

w0469402

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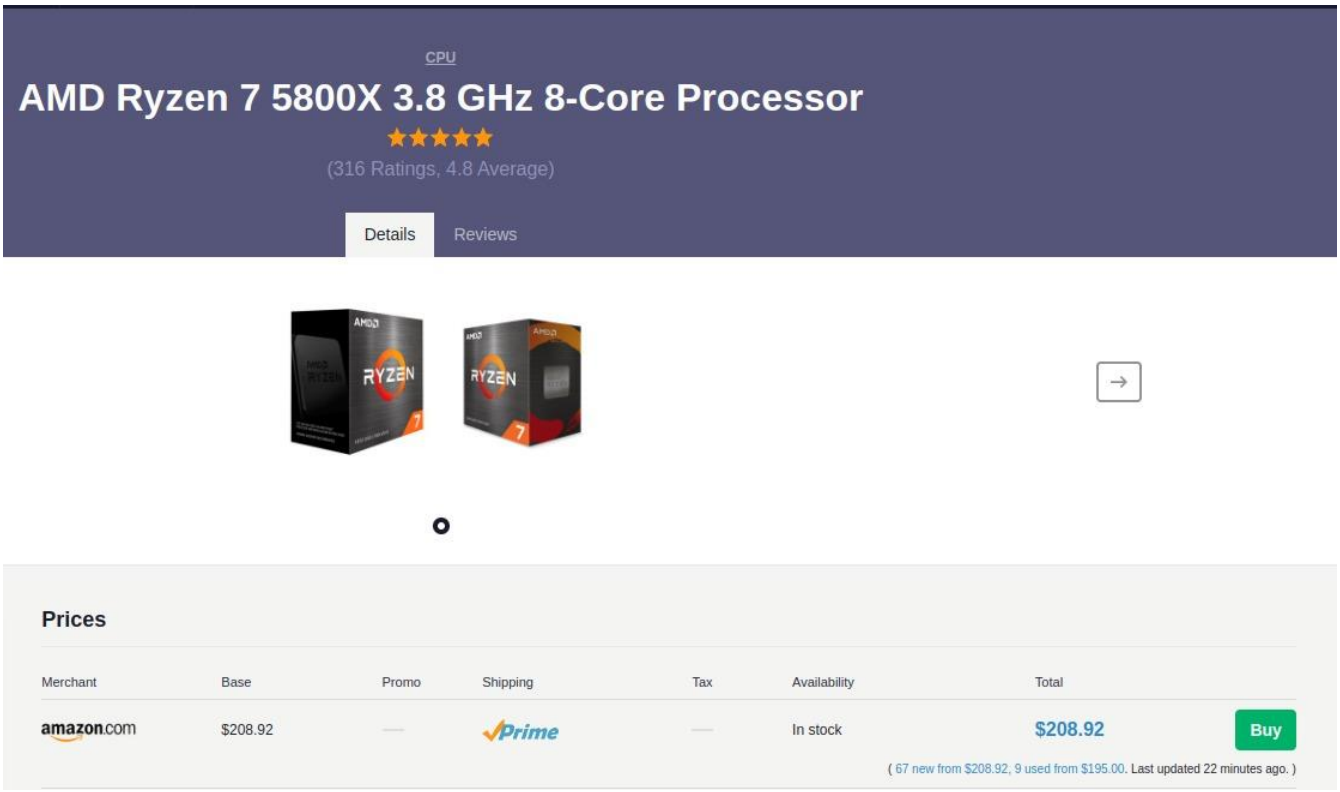
Part 2 Research Portion

Project 4-1 Recognizing Processors

1. Asus Prime A320M-K
2. AMD Athlon 200GE with Radeon Vega Graphics
3. Processor uses AM4 socket
4. Processor cooler uses cooler with both heatsink and fan. As it is an amd processor must be an aftermarket cooler. You don't need screwdrivers to remove the processor, however, the mount on the motherboard does have screws, so you may need screwdriver to replace the cooler.

Processor 4-2 Researching Processor Upgrade or Replacement

1. Supports the following AMD processors that use the AM4 Socket: AMD Ryzen, 7th generation AMD A Series processor, and Athlon processors. Up to 8 cores.
2. The following processors are compatible with this motherboard:
    a. AMD Ryzen 8 5800X



Specifications

Manufacturer
AMD

Part #
100-100000063WOF

Core Count
8

Performance Core Clock
3.8 GHz

Performance Boost Clock
4.7 GHz

TDP
105 W

Series
AMD Ryzen 7

Microarchitecture
Zen 3

Core Family
Vermeer

Socket
AM4

Integrated Graphics
None

Maximum Supported Memory
128 GB

ECC Support
No

Includes Cooler

Includes Cooler
No

Packaging
Boxed

Performance L1 Cache
- 8 x 32 kB Instruction
- 8 x 32 kB Data

Performance L2 Cache
8 x 512 kB

L3 Cache
1 x 32 MB

Lithography
7 nm

Includes CPU Cooler
No

Simultaneous Multithreading
Yes

b. Amd Ryzen 5 2400G with Vega Graphics

CPU

AMD Ryzen 5 2400G 3.6 GHz Quad-Core Processor

★★★★★

(80 Ratings, 4.8 Average)

Details | Reviews

Prices

Merchant	Base	Promo	Shipping	Tax	Availability	Total	
amazon.com	$135.00	—		—	In stock	$135.00+	Buy

Specifications

Manufacturer
AMD

Part #
YD2400C5FBBOX

Core Count
4

Performance Core Clock
3.6 GHz

Performance Boost Clock
3.9 GHz

TDP
65 W

Series
AMD Ryzen 5

Microarchitecture
Zen

Core Family
Raven Ridge

Socket
AM4

Integrated Graphics
Radeon Vega 11

ECC Support
No

Includes Cooler
Yes

Packaging
Boxed

c. AMD A6 9500

CPU

AMD A6-9500 3.5 GHz Dual-Core Processor

★★★★☆

(3 Ratings, 4.0 Average)

Details | Reviews

Prices

Merchant	Base	Promo	Shipping	Tax	Availability	Total	
amazon.com	$89.95	—		—	In stock	$89.95+	Buy

(7 new from $89.95, 6 used from $53.00. Last updated 22 minutes ago.)

* Product prices and availability are accurate as of the date/time indicated and are subject to change. Any price and availability information displayed on Amazon.com at the time of purchase will apply to the purchase of this product.
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Specifications

Manufacturer
AMD

Part #
AD9500AGABBOX

Core Count
2

Performance Core Clock
3.5 GHz

Performance Boost Clock
3.8 GHz

TDP
65 W

Series
AMD A6

Microarchitecture
Excavator

Core Family
Bristol Ridge

Socket
AM4

Integrated Graphics
Radeon R5 (on die)

ECC Support
No

Includes Cooler
Yes

Packaging
Boxed

3. This motherboard is good for many kinds of processors. For most use cases, I would recommend a 5600G. It comes with an included graphics included, so no need to purchase one. Unless you want to play games, if you do, you can buy a graphics card later. Whatever the processor is, nothing more than 8 cores, more than that the motherboard won't use them. Additionally, this MB is bounded by 32gb ram, a bigger processor would be bottlenecked by the 32gb limit.
4. Now of working on this lab, Sept 29 at 10am, the cheapest option is MSI PRO H610M-G DDR4 Micro ATX LGA1700 Motherboard, it is being sold for $79.98.

Project 4-4 Intel Processors

1. AMD processors have the pins on it, Intel has the pins on the sockets, not the processors. Instead, Intel the processor has small contact circles at the bottom. For AMD this is called PGA, whereas for Intel they use a socket config called LGA. Also, the AMD heatsink is squared and uses a mount plate on the motherboard that uses screws to install, however, many times you can replace the processor (not replace the heatsink) without a screwdriver. Intel uses pins you turn 90 degrees to secure it. No screwdrivers to install or replace the heatsink
2. The first intel processor that uses the modern design with no socket holes were the Intel Pentium and Celeron series for the 478 sockets, this new design was released in 2001
3. LGA 1150

Project 4-5 Using the Internet for Research

1. On the intel side, the most recent processor for consumers is the 13th generation Intel Core. For AMD, it's the 7000 Ryzen processors, the Ryzen 5000G series with Radeon Graphics.
2. For AMD, 6000 Ryzen processors, they have a U series for slim and energy efficient laptops, and H series for high performance. Intel handles those same codes for their laptop processors, but they offer 13th series laptop processors.
3. Some tablets use Intel Atom SoC (System on a chip, meaning everything except storage is included in the one chip). AMD has Ryzen Z1 series, for gaming handhelds, which is the new thing in computing. The ASUS ROG Ally has a Ryzen Z1 chip, for example.

Project 4-6

1. A boxed processor is a processor that comes in a box with all its documentation, cooler, and parts needed for installation. It usually is sold by the manufacturer.
2. Packaging, documentation, fan, cooler, and instruction manual.
3. The numbers on the box and processor are:
    a. Generational number (intel I5 12xxx means 12th gen)
    b. Position in range (Intel I5 XX400)

    c. Suffix (Intel I5 XXXXXH, the H is for high performance mobile processor)
4. Make sure the processor is well positioned because it requires a lot of pressure to secure. Also be careful with the heatsink pins, they break easily, and they don't have replacement parts, so you will need to replace the whole heatsink.

Project 4-7

1. The main substrate for silicon chips is quarts sand
2. Wafers are made with Silicon
3. The silicon is melted and purified into a single brick. The brick has then mono crystal properties, meaning that the arrangement of the atoms is continuous and unbroken to the edges of it. This gives the mono crystal silicon good physical properties for conducting electricity. It is not completely pure crystal, but close to it. It can also break easily into multiple crystals. Then the brick is sliced into thin discs and cleaned carefully. Then the discs are packed into sets, and moved with robot arms into other stations where they will print the desired circuit architecture into the discs
4. Photolithographic techniques such as slide projection. The disc is covered with chemicals and concentrated UV Light is shot to it, again with a robot. Then the remanent residue of this process is removed. Then the transferred structure of this disc can be used as a template for other discs to ease the process
5. UV Light
6. After the Photolithographic stage the wafers go to the ion implantation, where they will acquire the desired electrical properties. They do this with shooting charged atom particles, with heat these dopant atom particles will become fixed into the array of silicon molecules.
7. The cleaning has to be done in a very dust-free and sealed room to avoid anything entering into the chips and ruining their purity. Cleaning must be done at the nano level, they have also to etch some of the trenches made by the photolithography process before the copper coat is put in. After the trenches are filled with copper, the top part of the coating is removed using some very precise polishing tool
8. The copper has to be polished to the top part of the trench so that there is not any involuntary contact made with it. Copper is used to direct the current in the processor. The Silicon is a semiconductor, the copper has lots of conductive properties, so the electrons will pass through the copper as it is the least effort route rather than passing the walls of the silicon chip.
9. Microscopes are used to inspect the disc and verify its quality. Meaning printing well done and the silicon has no defects.
10. A monolithic crystal is desired because it is more predictable to work with it, also your processor will have fewer thermal issues the more uniform the crystal is, because a better flow of electrons will heat it much less.
11. When melting the glass into a mono crystal, the issue is that it is very fragile. The next steps from there will have to be taken with extreme care, to prevent it from shattering into multiple cristals. If this happens you can't work with it, especially on the higher-grade chips.