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Your Laptop's Midlife Crisis -How to Help It Cope

Part 1 - Adding RAM to Your Laptop

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What is the Lifespan of a Laptop?

- **Hardware is “current” for about 2 years**
- **Expect to avoid repair problems for about 4 years**
- **Could likely run for 10 years without problems if cared for**
- **“Useful” life is typically 5 years**
- **Varies with initial cost and capabilities**
- **Probably good for the useful life of the installed operating system**

Example: My two Fujitsu Laptops

- Lifebook AH531 - \$380 new in Sept. 2011
 - 15.6” display, Intel i3 processor
- Lifebook LH531 - \$400 new in June 2012
 - 14” display, Intel i5 processor
- Both have:
 - 500 GB hard drive, 2 GB RAM
 - USB 2.0, HDMI, 10/100/1000 LAN, 802.11N
 - Dual-layer DVD-RW, 1.3 Mpixel camera
 - Windows 7

Useful Life Trade-offs

- What they have going for them
 - Still fairly fast
 - Have most current interfaces
 - Good operating system
 - Appear to be reliable
- What they lack
 - More RAM
 - Larger hard drive and/or solid state drive
 - USB3
 - Blu-ray drive

Most Popular Laptop Upgrades

- More memory
- Larger hard drive
- Solid-state drive
- Faster interfaces (USB3, Gigabit Ethernet, 802.11N wireless)
- HDMI output
- Blu-ray drive
- New battery*

Why Add Memory to a Laptop?

- Processor stores data and runs programs out of available RAM - swaps data with hard drive as needed
- Added RAM allows computer to run out of RAM with fewer “swaps” with slower hard drive to run large or multiple applications
 - Adding enough RAM to eliminate swapping can make computer run 10 to 50 times faster for these applications

Adding RAM to a Laptop

- Most laptops allow access to memory DIMMs (dual in-line memory modules)
 - DIMMs are in sockets
- New memory modules are added, or old modules are replaced with larger-capacity modules
- The type of memory allowed and maximum memory capacity is specified by the laptop manufacturer

Example: My Fujitsu Laptops

- Per user manuals (both list the same):

Memory

System Memory

- DDR3-1333 MHz SDRAM dual-channel memory module
- Two DIMM slots; upgradeable to 8 GB of total memory (4 GB x 2)

Cache Memory

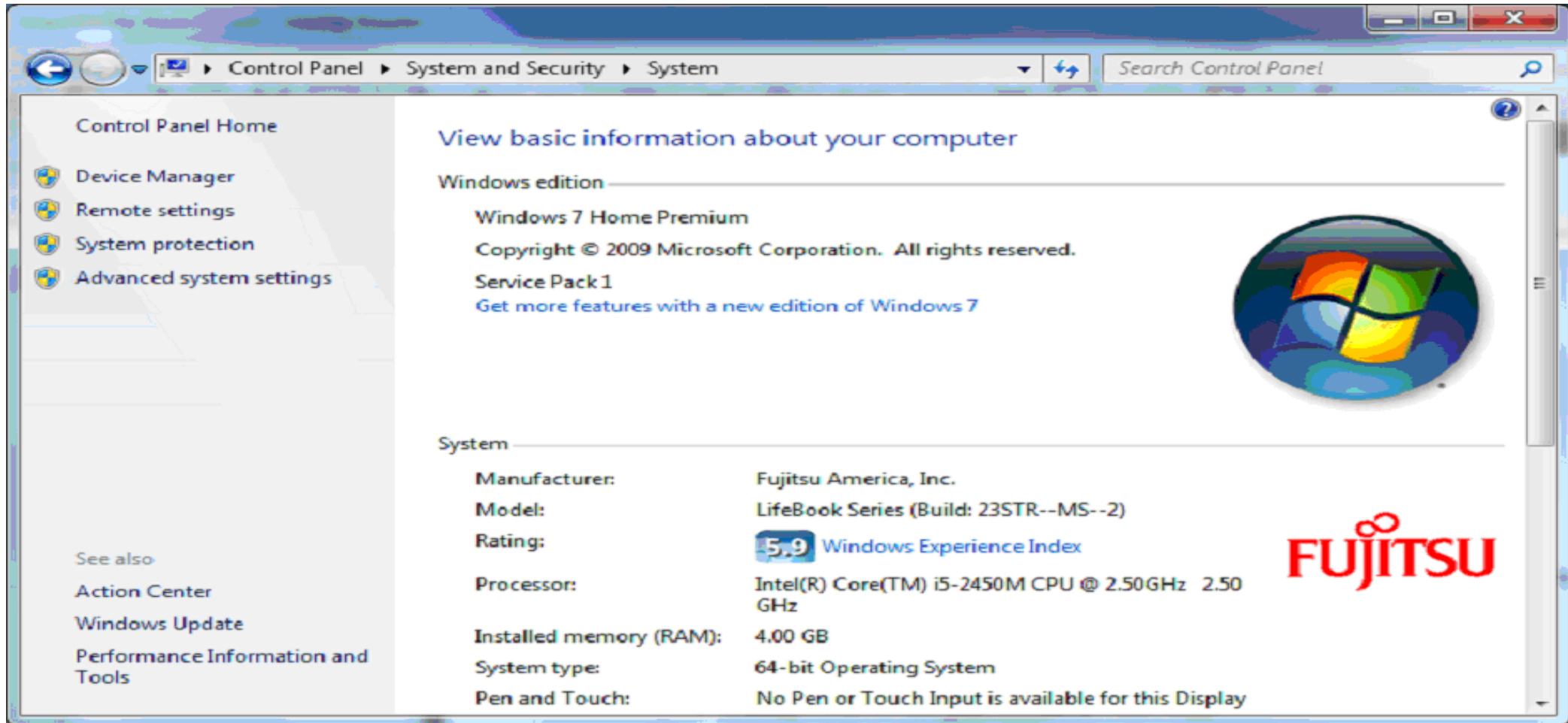
3 MB or 4 MB L3 cache on-die (depending upon system processor)

- Per purchase specifications, installed memory is 4 GB in each laptop

How to Verify Memory

- Through Windows 7 Control Panel
 - Control Panel -> System and Security -> System
- Through BIOS (Basic Input-Output System)
 - Go to BIOS screen on start-up, per manufacturer (F2 key on Fujitsu laptops)

Windows Control Panel

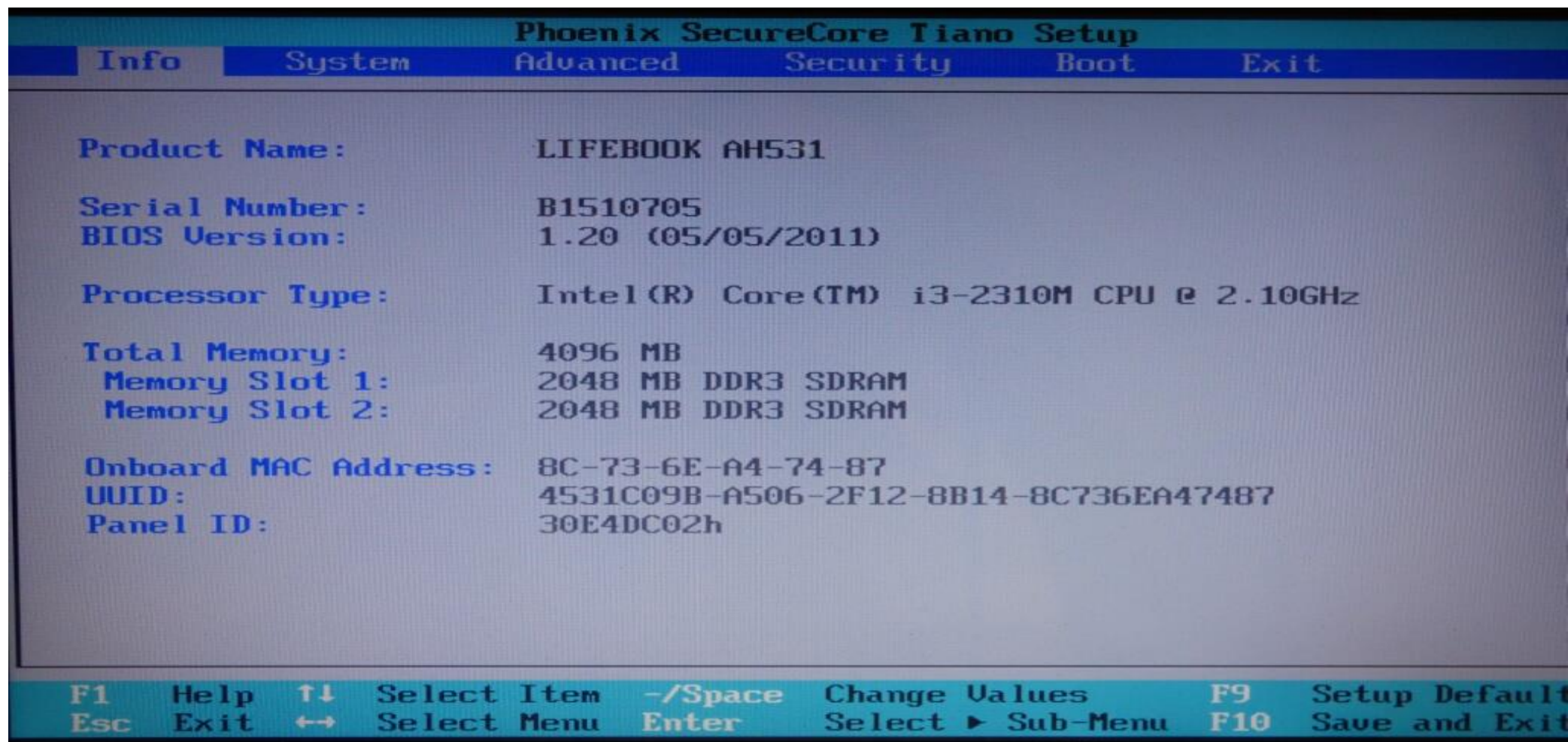


The screenshot shows the Windows Control Panel window with the following content:

- Navigation:** Control Panel > System and Security > System. Search Control Panel.
- Left Sidebar:**
 - Control Panel Home
 - Device Manager
 - Remote settings
 - System protection
 - Advanced system settings
 - See also: Action Center, Windows Update, Performance Information and Tools
- Main Content:**
 - View basic information about your computer**
 - Windows edition:** Windows 7 Home Premium. Copyright © 2009 Microsoft Corporation. All rights reserved. Service Pack 1. [Get more features with a new edition of Windows 7](#)
 - System:**

Manufacturer:	Fujitsu America, Inc.
Model:	LifeBook Series (Build: 23STR--MS--2)
Rating:	5.9 Windows Experience Index
Processor:	Intel(R) Core(TM) i5-2450M CPU @ 2.50GHz 2.50 GHz
Installed memory (RAM):	4.00 GB
System type:	64-bit Operating System
Pen and Touch:	No Pen or Touch Input is available for this Display
 - Logos:** Windows logo and Fujitsu logo.

BIOS screen



Can More Memory Be Added?

- Is it at full capacity?
 - Check in Windows Control Panel or BIOS
- Is there room in the laptop for more?
 - Check in BIOS, or open laptop



How to Access the Memory

- Requires a small screwdriver (typically phillips)
- Turn laptop over on work surface
- Locate the access door for the memory
- Remove the screw(s)
- Carefully pry the door up and off

Fujitsu AH531



Fujitsu AH531



Fujitsu LH531



Fujitsu LH531



What Kind of Memory to Get?

- Check with manufacturer
 - Unfortunately, Fujitsu does not offer any information for these models
- Look at the memory that came with it
 - Buy same brand and type
 - Originals were Samsung 2 GB - can get 4 GB
- Check with major memory vendors for memory finders
 - www.kingston.com
 - www.crucial.com

My Upgrade

- Originals were Samsung M471B5773DH0, 2 GB, DDR3-1333, PC3-10600, 204-pin SODIMM



- Can buy Samsung M471B5273DH0, 4 GB version, for \$42 each
- Buy four of 4 GB DIMMs - replace all 2 GB DIMMS - for 8 GB total each laptop

The Cautious Upgrade

- Run a memory test to verify your laptop and all present memory are good
- Buy one 4 GB memory DIMM
- Remove one 2 GB DIMM and replace with the 4 GB DIMM
- Verify 6 GB is now recognized
- Rerun memory test to verify new memory
- Buy three more 4 GB DIMMs
- Install all 4 GB DIMMs - run memory test

Memory Test

- Windows Memory Diagnostic Tool (Win7)
- Under Start -> Control Panel
 - Enter “Memory” in the search box, then click on “Diagnose your computer’s memory problems”
 - Test will restart your computer and run the test tool
 - Press F1 while in the tool to set options - the defaults are good (standard test, 2 passes)
- Results reported after reboot to Windows

Windows Mem Diagnostic Tool

Windows Memory Diagnostics Tool

Windows is checking for memory problems...
This might take several minutes.

Running test pass 1 of 2: 22% complete
Overall test status: 11% complete

Status:

No problems have been detected yet.

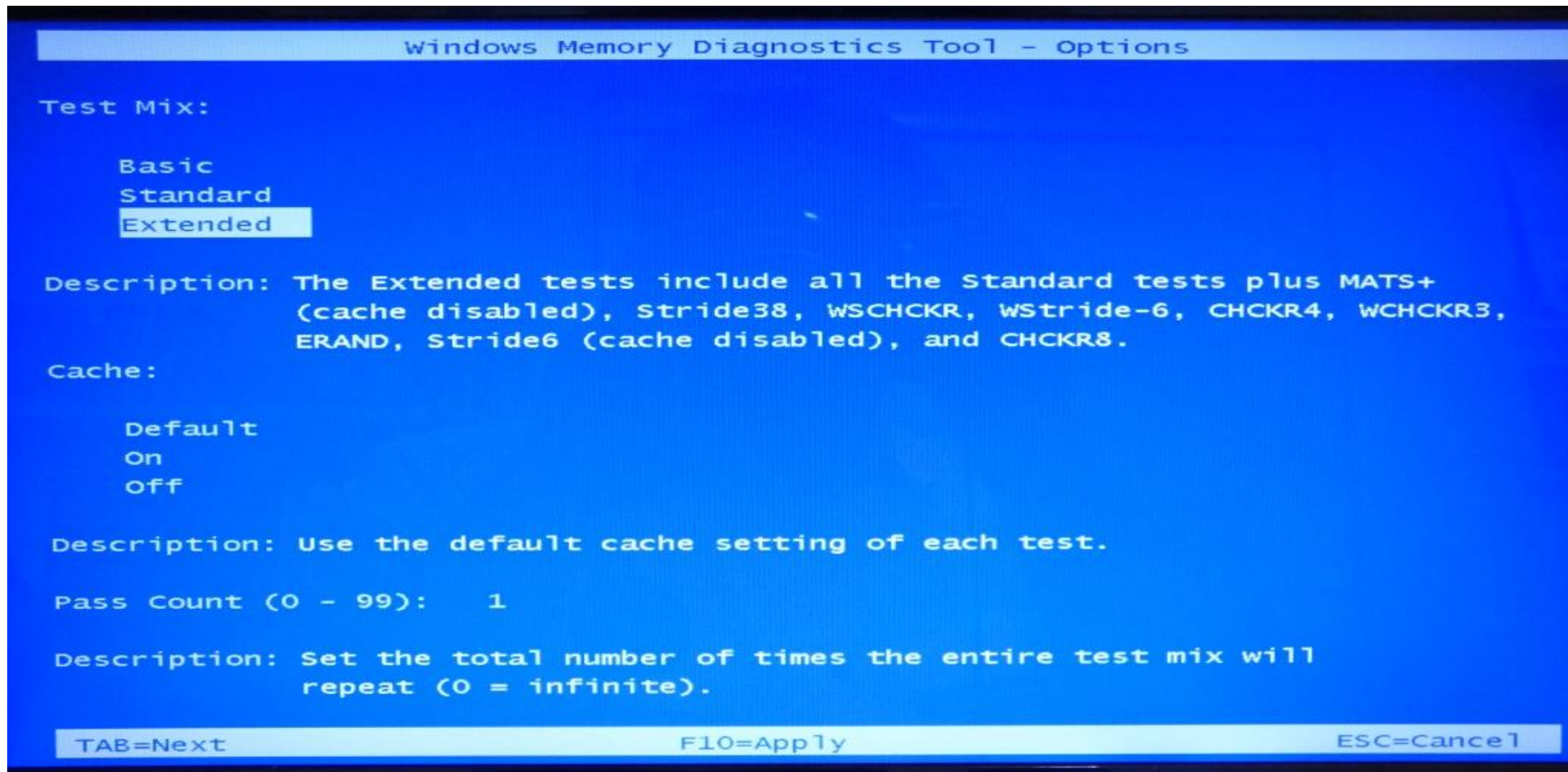
Although the test may appear inactive at times, it is still running. Please wait until testing is complete...

Windows will restart the computer automatically. Test results will be displayed again after you log on.

F1=Options

ESC=Exit

Windows Mem Diagnostic Tool



Changing DIMMs

- Remove memory cover
- Touch a metal chassis part or use a wrist strap connected to laptop chassis
- Press the two retainers (one on each side) to release the DIMMs and remove them
- Carefully install the new DIMMs at the same angle, then press down to snap in

Once the new memory is installed and verified, your laptop will feel better about itself!

Questions?

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