Dell™ OptiPlex™ 780 Service Manual

Desktop Computer

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

If you purchased a Dell™ n Series computer, any references in this document to Microsoft® Windows® operating systems are not applicable.

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Working on Your Computer

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Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have performed the steps in Working on Your Computer.
- You have read the safety information that shipped with your computer.
- A component can be replaced or—if purchased separately—installed by performing the removal procedure in reverse order.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see Turning Off Your Computer).

CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

3. Disconnect all network cables from the computer.
5. Disconnect your computer and all attached devices from their electrical outlets.
6. Press and hold the power button while the system is unplugged to ground the system board.
7. Remove the cover.

CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.

Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe
- Flash BIOS update program CD (see the Dell Support website at **support.dell.com**)

Turning Off Your Computer

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1. Shut down the operating system:

   In Windows Vista®:

   Click **Start** , then click the arrow in the lower-right corner of the **Start** menu as shown below, and then click **Shut Down**.

   

   In Windows® XP:

   Click **Start**® **Turn Off Computer**® **Turn Off**.

   The computer turns off after the operating system shutdown process is complete.

2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

After Working Inside Your Computer

After you complete any replacement procedure, ensure you connect any external devices, cards, and cables before turning on your computer.

1. Replace the cover.

CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

2. Connect any telephone or network cables to your computer.
3. Connect your computer and all attached devices to their electrical outlets.
4. Turn on your computer.
5. Verify that the computer works correctly by running the Dell Diagnostics. See Dell Diagnostics.

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Removing and Replacing Parts

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Technical Specifications

NOTE: Offerings may vary by region. For more information regarding the configuration of your computer, click Start® Help and Support and select the option to view information about your computer.

NOTE: Unless otherwise stated, the specifications are identical for mini-tower, desktop, and small form factor computers.

Processor	
Type	Intel® Core™2 Duo; FSB up to 1333 MHz Intel Core 2 Quad; FSB up to 1333 MHz Intel Pentium® Dual Core; FSB up to 1066 MHz Intel Celeron®; FSB up to 800 MHz
Level 2 (L2) cache	at least 512 KB pipelined-burst, eight-way set associative, writeback SRAM

Memory	
Type	DDR3 SDRAM (non-ECC memory only)
Speed	1067 MHz
Connectors	four
Capacity	1 GB, 2 GB or 4 GB non-ECC
Minimum memory	1 GB
Maximum memory	16 GB

Video	
Integrated	Intel graphics media accelerator X4500 up to 256 MB shared video memory (total system memory greater than 512 MB)
Discrete	PCI Express x16 slot supports either a PCI Express card or a DVI add-on card (for dual-monitor support)

Audio	
Integrated	Intel high definition audio

Network	
Integrated	Intel integrated network interface card capable of 10/100/1000 Mb/s communication

System Information	
Chipset	Intel® Q45 Express chipset w/ICH10DO
DMA channels	eight
Interrupt levels	24
BIOS chip (NVRAM)	64 Mb

Expansion Bus	
Bus type	PCI 2.3 PCI Express 2.0 SATA 1.0A and 2.0 eSATA USB 2.0
Bus speed	PCI: 133 MB/s PCI Express: x1-slot bidirectional speed — 250 MB/s x16-slot bidirectional speed — 8 GB/s SATA: 1.5 Gbps and 3.0 Gbps eSATA: 3.0 Gbps USB: 480 Mbps

Cards	
PCI	
Mini-tower	up to two full height cards
Desktop	without riser card — up to two low profile cards with riser card — up to two full height cards
Small form factor	one low profile card
PCI Express x1	
Mini-tower	one full height card
Desktop	none
Small form factor	none
PCI Express x16	
Mini-tower	one full height card
Desktop	without riser — one low profile card with riser — one full height card

Small form factor	one low profile card
NOTE: The PCI Express x16 slot is disabled when a display is connected to the integrated video connector.	

Drives	
Externally accessible	
5.25 inch drive bay(s) Mini-tower Desktop Small form factor	for SATA DVD-ROM, DVD+/-RW, or CD +/-RW drives two bays one bay one slimline bay
3.5 inch drive bay Mini-tower Desktop Small form factor	for 19-in-1 Media Card Readers one bay one bay one slimline bay
Internally accessible	
3.5 inch drive bay(s) Mini-tower Desktop Small form factor	for hard drives two bays one bay one bay
NOTE: Your computer can support up to two 2.5 inch hard drives with brackets.	

External Connectors	
Audio	
Back panel	two connectors for line-in/ microphone and line-out
Front panel	two front-panel connectors for headphones and microphone
eSATA	one 7-pin connector
Network	one RJ45 connector
Parallel	one 25-pin connector (bidirectional)
Serial	one 9-pin connector; 16550C-compatible
USB	
Front panel	two connectors
Back panel	six connectors
Video	one 15-hole VGA connector one 20-pin DisplayPort connector

System Board Connectors	
PCI 2.3 Mini-tower	data width (maximum) — 32 bits two 120-pin connectors

Desktop	two 120-pin connectors
Small form factor	one 120-pin connector
PCI Express x1	data width (maximum) — one PCI Express lane
Mini-tower	one 36-pin connector
Desktop	not applicable
Small form factor	not applicable
PCI Express x16	one 164-pin connector data width (maximum) — 16 PCI Express lanes
Serial ATA	
Mini-tower	four 7-pin connectors
Desktop	three 7-pin connectors
Small form factor	three 7-pin connectors
Memory	four 240-pin connectors
Internal USB device	one 10-pin connector (supports two USB ports)
Processor fan	one 5-pin connector
Hard-drive fan	one 5-pin connector
Front panel control	one 40-pin connector
Processor	one 775-pin connector
Power 12V	one 4-pin connector
Power	one 24-pin connector

Controls and Lights	
Front of the computer	
Power button	push button
Power light	blinking green — indicates that the computer is in sleep state solid green — indicates that the computer is in power-on state blinking amber — indicates a problem with the system board solid amber — indicates that the system board is unable to initialize
Drive activity light	blinking green — indicates that the computer is reading data from or writing data to the hard drive
Network connectivity light	green — indicates that a good connection exists between the network and the computer off (no light) — indicates that the computer is not detecting a physical connection to the network

Diagnostic lights	four lights. For more information, see Diagnostics.
Back of the computer	
Link integrity light on integrated network adapter	green — a good 10 Mbps connection exists between the network and the computer. orange — a good 100 Mbps connection exists between the network and the computer. yellow — a good 1000 Mbps connection exists between the network and the computer. off (no light) — the computer is not detecting a physical connection to the network.
Network activity light on integrated network adapter	yellow light — A blinking yellow light indicates that network activity is present.

Power	
DC power supply	
Wattage	
Mini-tower	305 W (non-EPA) or 255 W (EPA)
Desktop	255 W (EPA)
Small form factor	235 W (EPA)
Maximum heat dissipation	
Mini-tower	1041 BTU/hr
Desktop	955 BTU/hr
Small form factor	938 BTU/hr
Voltage	90–265 VAC, 50/60 Hz
Coin-cell battery	3 V CR2032 lithium coin cell
NOTE: Heat dissipation is calculated by using the power supply wattage rating. **NOTE:** See the safety information that shipped with your computer for important voltage setting information.	

Physical	
Height	
Mini-tower	40.80 cm (16.10 inches)
Desktop	11.40 cm (4.50 inches)
Small form factor	9.26 cm (3.65 inches)
Width	
Mini-tower	18.70 cm (7.40 inches)
Desktop	39.90 cm (15.70 inches)
Small form factor	31.40 cm (12.40 inches)
Depth	

Mini-tower	43.30 cm (17.00 inches)
Desktop	35.30 cm (13.90 inches)
Small form factor	34.00 cm (13.40 inches)
Weight	
Mini-tower	11.70 kgs (25.80 lbs)
Desktop	8.26 kgs (18.20 lbs)
Small form factor	6.80 kgs (15.00 lbs)

Environmental	
Temperature	
Operating	10° to 35°C (50° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)
Relative humidity (noncondensing)	operating: 20% to 80% (maximum wet bulb temperature: 29°C) storage: 5% to 95% (maximum wet bulb temperature: 38°C
Maximum vibration	
Operating	5 to 350 Hz at 0.0002 G^2/Hz
Storage	5 to 500 Hz at 0.001 to 0.01 G^2/Hz
Maximum shock	
Operating	40 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 20 in/sec [51 cm/sec])
Storage	105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 50 in/sec [127 cm/sec])
Altitude	
Operating	–15.2 to 3048 m (–50 to 10,000 ft)
Storage	–15.2 to 10,668 m (–50 to 35,000 ft)
Airborne contaminant level	G2 or lower as defined by ISA-S71.04-1985

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Diagnostics

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Dell Diagnostics

When to Use the Dell Diagnostics

It is recommended that you print these procedures before you begin.

NOTE: The Dell Diagnostics software works only on Dell computers.

NOTE: The *Drivers and Utilities* media is optional and may not ship with your computer.

Enter system setup (see Entering System Setup), review your computer's configuration information, and ensure that the device you want to test displays in System Setup and is active.

Start the Dell Diagnostics from either your hard drive or from the *Drivers and Utilities* media.

Starting the Dell Diagnostics From Your Hard Drive

1. Turn on (or restart) your computer.
2. When the DELL logo appears, press <F12> immediately.

NOTE: If you see a message stating that no diagnostics utility partition has been found, run the Dell Diagnostics from your *Drivers and Utilities* media.

   If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft® Windows® desktop. Then shut down your computer and try again.

3. When the boot device list appears, highlight **Boot to Utility Partition** and press <Enter>.
4. When the Dell Diagnostics **Main Menu** appears, select the test that you want to run.

Starting the Dell Diagnostics From the Drivers and Utilities Disc

1. Insert the *Drivers and Utilities* disc.
2. Shut down and restart the computer.

   When the DELL logo appears, press <F12> immediately.

   If you wait too long and the Windows logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again.

NOTE: The next steps change the boot sequence for one time only. On the next startup, the computer boots according to the devices specified in the system setup program.

3. When the boot device list appears, highlight **Onboard or USB CD-ROM Drive** and press <Enter>.

4. Select the **Boot from CD-ROM** option from the menu that appears and press <Enter>.
5. Type 1 to start the menu and press <Enter> to proceed.
6. Select **Run the 32 Bit Dell Diagnostics** from the numbered list. If multiple versions are listed, select the version appropriate for your computer.
7. When the Dell Diagnostics **Main Menu** appears, select the test you want to run.

Dell Diagnostics Main Menu

1. After the Dell Diagnostics loads and the **Main Menu** screen appears, click the button for the option you want.

Option	Function
Express Test	Performs a quick test of devices. This test typically takes 10 to 20 minutes and requires no interaction on your part. Run **Express Test** first to increase the possibility of tracing the problem quickly.
Extended Test	Performs a thorough check of devices. This test typically takes 1 hour or more and requires you to answer questions periodically.
Custom Test	Tests a specific device. You can customize the tests you want to run.
Symptom Tree	Lists the most common symptoms encountered and allows you to select a test based on the symptom of the problem you are having.

2. If a problem is encountered during a test, a message appears with an error code and a description of the problem. Write down the error code and problem description and follow the instructions on the screen.
3. If you run a test from the **Custom Test** or **Symptom Tree** option, click the applicable tab described in the following table for more information.

Tab	Function
Results	Displays the results of the test and any error conditions encountered.
Errors	Displays error conditions encountered, error codes, and the problem description.
Help	Describes the test and may indicate requirements for running the test.
Configuration	Displays your hardware configuration for the selected device. The Dell Diagnostics obtains configuration information for all devices from system setup, memory, and various internal tests, and it displays the information in the device list in the left pane of the screen. The device list may not display the names of all the components installed on your computer or all devices attached to your computer.
Parameters	Allows you to customize the test by changing the test settings.

4. When the tests are completed, if you are running the Dell Diagnostics from the *Drivers and Utilities* disc, remove the disc.
5. Close the test screen to return to the **Main Menu** screen. To exit the Dell Diagnostics and restart the computer, close the **Main Menu** screen.

Power Button Light Codes

The diagnostic lights give much more information about the system state, but legacy power light states are also supported in your computer. The power light states are shown in following table.

Power Light State	Description
Off	

	Power is off, light is blank.
Blinking Amber 	Initial state of light at power up. Indicates system has power, but the POWER_GOOD signal is not yet active. If the **Hard Drive light is off**, it is probable that the power supply needs to be replaced. If the **Hard Drive light on**, it is probable that an onboard regulator or VRM has failed. Look at the diagnostic lights for further information.
Solid Amber 	Second state of the light at power up. Indicates the POWER_GOOD signal is active and it is probable that the power supply is fine. Look at the diagnostic lights for further information.
Blinking Green 	System is in a low power state, either S1 or S3. Look at the diagnostic lights to determine which state the system is in.
Solid Green 	System is in S0 state, the normal power state of a functioning machine. The BIOS will turn the light to this state to indicate it has started fetching op-codes.

Beep Codes

If the monitor cannot display error messages during the POST, the computer may emit a series of beeps that identifies the problem or that can help you identify a faulty component or assembly. The following table lists the beep codes that may be generated during the POST. Most beep codes indicate a fatal error that prevents the computer from completing the boot routine until the indicated condition is corrected.

Code	**Cause**
1-1-2	Microprocessor register failure
1-1-3	NVRAM read/write failure
1-1-4	ROM BIOS checksum failure
1-2-1	Programmable interval timer failure
1-2-2	DMA initialization failure
1-2-3	DMA page register read/write failure
1-3	Video Memory Test failure
1-3-1 through 2-4-4	Memory not being properly identified or used
3-1-1	Slave DMA register failure
3-1-2	Master DMA register failure
3-1-3	Master interrupt mask register failure
3-1-4	Slave interrupt mask register failure
3-2-2	Interrupt vector loading failure
3-2-4	Keyboard Controller Test failure
3-3-1	NVRAM power loss
3-3-2	Invalid NVRAM configuration
3-3-4	Video Memory Test failure
3-4-1	Screen initialization failure
3-4-2	Screen retrace failure

3-4-3	Search for video ROM failure
4-2-1	No timer tick
4-2-2	Shutdown failure
4-2-3	Gate A20 failure
4-2-4	Unexpected interrupt in protected mode
4-3-1	Memory failure above address 0FFFFh
4-3-3	Timer-chip counter 2 failure
4-3-4	Time-of-day clock stopped
4-4-1	Serial or parallel port test failure
4-4-2	Failure to decompress code to shadowed memory
4-4-3	Math-coprocessor test failure
4-4-4	Cache test failure

Diagnostic Lights

To help troubleshoot a problem, your computer has four lights labeled 1, 2, 3, and 4 on the bank panel. When the computer starts normally, the lights flash before turning off. If the computer malfunctions, the sequence of the lights help to identify the problem.

NOTE: After the computer completes POST, all four lights turn off before booting to the operating system.

Light Pattern	Problem Description	Suggested Resolution
	The computer is in a normal *off* condition or a possible pre-BIOS failure has occurred. The diagnostic lights are not lit after the computer successfully boots to the operating system.	• Plug the computer into a working electrical outlet. • If the problem persists, contact Dell.
	A possible processor failure has occurred.	• Reseat the processor (see Processor information for your computer). • If the problem persists, contact Dell.
	Memory modules are detected, but a memory failure has occurred.	• If two or more memory modules are installed, remove the modules, then reinstall one module and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error. • If available, install working memory of the same type into your computer. • If the problem persists, contact Dell.
	A possible graphics card failure has occurred.	• Reseat any installed graphics cards. • If available, install a working graphics card into your computer. • If the problem persists, contact Dell .
	A possible floppy drive or hard drive failure has occurred.	Reseat all power and data cables.
	A possible USB failure has occurred.	Reinstall all USB devices and check all cable connections.

	No memory modules are detected.	• If two or more memory modules are installed, remove the modules, then reinstall one module and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error. • If available, install working memory of the same type into your computer. • If the problem persists, contact Dell.
	Memory modules are detected, but a memory configuration or compatibility error has occurred.	• Ensure that no special requirements for memory module/connector placement exist. • Ensure that the memory you are using is supported by your computer (see the "Specifications" section for your computer). • If the problem persists, contact Dell.
	A possible expansion card failure has occurred.	• Determine if a conflict exists by removing an expansion card (not a graphics card) and restarting the computer. • If the problem persists, reinstall the card you removed, then remove a different card and restart the computer. • Repeat this process for each expansion card installed. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts. • If the problem persists, contact Dell.
	Another failure has occurred.	• Ensure that all hard drive and optical drive cables are properly connected to the system board . • If there is an error message on the screen identifying a problem with a device (such as the floppy drive or hard drive), check the device to make sure it is functioning properly. • If the operating system is attempting to boot from a device (such as the floppy drive or optical drive), check system setup to ensure the boot sequence is correct for the devices installed on your computer. • If the problem persists, contact Dell.

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System Setup

Dell™ OptiPlex™ 780 Service Manual—Mini-Tower, Desktop, and Small Form Factor

Boot Menu

Press <F12> when the Dell™ logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system.

The options listed are:

Internal HDD
CD/DVD/CD-RW Drive
Onboard NIC
BIOS Setup
Diagnostics

This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

Navigation Keystrokes

Use the following keystrokes to navigate the System Setup screens.

Navigation Keystrokes	
Action	**Keystroke**
Expand and collapse field	<Enter>, left- or right-arrow key, or +/–
Expand or collapse all fields	< >
Exit BIOS	<Esc>—Remain in Setup, Save/Exit, Discard/Exit
Change a setting	Left or right-arrow key
Select field to change	<Enter>
Cancel modification	<Esc>
Reset defaults	<Alt><F> or **Load Defaults** menu option

Entering System Setup

Your computer offers the following BIOS and System Setup options:

- Bring up a one-time boot menu by pressing <F12>
- Access System Setup by pressing <F2>

<F12> Menu

Press <F12> when the Dell™ logo appears to initiate a one-time boot menu with a list of the valid boot devices for the computer. **Diagnostics** and **Enter Setup** options are also included in this menu. The devices listed on the boot menu depend on the bootable devices installed in the computer. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the computer. Making changes in the boot menu does not make any changes to the boot order stored in the BIOS.

<F2>

Press <F2> to enter System Setup and make changes to user-definable settings. If you have trouble entering System Setup using this key, press <F2> when the keyboard lights first flash.

System Setup Menu Options

NOTE: System Setup options may vary depending on your computer and may not appear in the exact same order.

General	
System Board	Displays the following information: • System information: Displays **BIOS Info,**, **System Info, Service Tag, Express Service Code, Asset Tag, Manufacture Date,** and the **Ownership Date..**

	• Memory information: Displays **Installed Memory**, **Usable Memory, Memory Speed, Memory Channel Mode, Memory Technology, DIMM_1 Size, DIMM_2 Size, DIMM_3 Size,** and **DIMM_4 Size. .** • Processor information: Displays the **Processor Type, Processor Speed, Processor Bus Speed, Processor L2 cache, Processor ID, Microcode Version, Multi Core Capable** and **HT Capable 64-bit Technology..** • PCI information: Displays available slots on the system board.
Date/Time	Displays the system date and time. Changes to the system date and time take effect immediately.
Boot Sequence	Specifies the order in which the computer attempts to find an operating system from the devices specified in this list. • **Onboard or USB Floppy** • **HDD(will show the model currently in system)** • **Onboard or USB CD-Rom Drive** • **USB Device**

Drives	
Diskette drive	This field determines how the BIOS configures floppy drives, Operating Systems with USB support will recognize USB Floppy drives regardless of this setting: • **Disable - All Floppy drive are disable** • **Enable - All floppy drive are enable.** The "USB Controller" Setup option will affect floppy operation.
SATA Operation	configures the operating mode of the integrated hard drive controller. • **RAID Autodetect / AHCI** = RAID if signed drives, otherwise AHCI • **RAID Autodetect / ATA**= RAID if signed drives, otherwise ATA • **RAID On / ATA**= SATA is configured for RAID on every boot • **Legacy** = The hard drive controller is configured for legacy mode **Legacy** mode provides for compatibility with some older operating systems that do not support native resources assigned to the drive controller. **RAID Mode is incompatible with ImageServer. Please disable RAID mode if enabling Image Server.**
S.M.A.R.T. Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART(Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.
Drives	Enables or disables the SATA or ATA drives connected to the system board.

System Configuration	
Integrated NIC	Enables or disables the integrated network card. You can set the integrated NIC to: • Disable • Enable (default) • **Enable with PXE** • **Enable with ImageSever** ImageServe is incompatible with RAID mode. Please disable RAID if enabling ImageServer. PXE is needed only if intending to boost to an operating system located on a server, not if you are booting on an OS located on a hard drive in this system.
USB for Flex bay	This field enable and disable the internal USB for Flex Bay, you can set: • **Disable** - Internal USB for Flex Bay is disable • **Enable** - Internal USB for Flex Bay is enable • **No Boot** - Internal USB for Flex Bay is enable, but not bootable. (default)
USB Controller	Enables or disables the integrated USB controller. You can set the USB controller to: • **Enable** (default) • **Disable** • **No boot** Operating systems with USB support will recognize USB Storage
Parallel Port	Identifies and defines the parallel port settings. You can set the parallel port to: • **Disable** • **AT** • **PS/2 (default)** • **EPP** • **ECP No DMA** • **ECP DMA 1** • **ECP DMA 3**
Parallel Port Address	Sets the base I/O address of the integrated parallel port.
Serial Port #1	Identifies and defines the serial port settings. You can set the serial port to: • **Disable** • **Auto** (default) • **COM1** • **COM3**

	The Operating System may allocate resources even though the setting is disabled.
Serial Port #2	Identifies and defines the serial port settings. You can set the serial port to: • **Disable** • **Auto** (default) • **COM2** • **COM4** The Operating System may allocate resources even though the setting is disabled.
Miscellaneous Devices	Enables or disables the following onboard devices: • **Front USB** • **Rear Dual USB** • **Rear Quad USB** • **PCI slots** • **Audio**

Video	
Primary Video	This field determines which video controller will become the primary video controller when 2 controllers are available in the system. This selection matters only if there are 2 video controller present. • **Auto**(default) - Use the add-in video controller. • **Onboard/Card** - Use the integrated video controller unless a Graphic care is installed. A PCI Express Graphic(PEG) card will override and disable the integrated video controller.

Performance	
Multi Core Support	This field specifies whether the processor will have one or all cores enable. The performance of some application will improve with the additional cores.
Intel® SpeedStep™	This Option enables or disables the Intel® SpeedStep™ mode of the processor. When disabled, the system is placed into the highest performance state and the Intel® SpeedStep™ applet or native operating system driver are prevented from adjusting the processor's performance. When enable. the Intel® SpeedStep™, enabled CPU is allowed to operate in multiple performance states. This option is disabled by default.
C States Control	This option enables or disables additional processor sleep states. The operating system may optionally use these for additional power saving when idle. This option is disabled by default.
Limit CPUID Value	This field limits the maximum value the processor Standard CPUID Function will support. Some operating systems will not complete installation when the maximum CPUID Function supported is greater than 3. This option is disabled by default.
HDD Acoustic Mode	This option allows you to optimize your hard drives performance and acoustic noise level based on your personal preferences. • **Bypass**(default)- Do nothing (needed for older drives) • **Quiet**- The drive is slower, but quieter. • **Suggested** - Allow drive manufacturer to select the mode. • **Performance**- The drive is faster, but possibly noisier.

Virtualization Support	
Virtualization	This Option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel® Virtualization Technology. **Enable Intel®** Virtualization **Technology** - This option is disabled by default.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. **Enable Intel® Virtualization Technology for Direct I/O** - This option is disabled by default.
Trusted Execution	Field specifies whether a Measured Virtual Machine(MVMM) can utilize the additional hardware capabilities provided by Intel® Trusted Execution Technology. The TPM Virtualization Technology and Virtualization Technology for Direct I/O must be enable to use this feature. **Enable Intel® Trusted Execution Technology** - This option is disabled by default.

Security	
Administrative Password	Provides restricted access to the computer's system setup program in the same way that access to the system can be restricted with the **System Password option.** This option is not set by default.
System Password	Displays the current status of the system's password security feature and allows a new system password to be assigned and verified. This option is not set by default.
Password Changes	Enables or disables the user from changing the system password without the administrative password. This option is enabled by default.
TPM Security	Enables or disables the trusted platform module (TPM) security.

	You can set the TPM security to: • **Deactivate** (default) • **Activate** • **Clear** NOTE: When TPM Security is set to **Clear the system setup program clears the user information stored in the TPM.**
CPU XD Support	Enables or disables the execute disable mode of the processor. This option is enabled by default.
Computrace(R)	Enables or disables the optional Computrace® service designed for asset management. You can set this option to: • **Deactivate** (default) • **Disable** • **Activate**
SATA-0 Password	Displays the current status of the password set for the hard drive connected to the SATA-0 connector on the system board. You can also set a new password. This option is not set by default. NOTE: The system setup program displays a password for each of the hard drives connected to your system board.

Power Management	
AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: • **Power Off** (default) • **Power On** • **Last State**
Auto On Time	Sets time to automatically turn on the computer. Time is kept in the standard 12-hour format (hours:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. NOTE: This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if **Auto Power On is set to disabled.**
Low Power Mode	Enables or disables low power mode. This option is disabled by default. When low power mode is enabled, the integrated network card is disabled when the system is shutdown or in Hibernate mode. Only Add-in NIC cards will be able to remotely wake the system.
Remote Wake up	Allows the system to power up when a network interface controller receives a wake up signal**.** You can set Remote Wake up to: • **Disable** (default) • **Enable** • **Enable with Boot NIC**
Suspend Mode	Sets the power management suspend mode to: • **S1** • **S3** (default) NOTE: If the AMT Management Engine (ME) of the system is **disabled**, the S1 suspend mode is unavailable in the system setup.
Fan Control Override	Controls the speed of the system fan. NOTE: When enabled, the fan runs at full speed.

Maintenance	
Service Tag	Displays the Service Tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
SERR Messages	Controls the SERR Message mechanism. This option is enabled by default. Some graphics cards require the SERR Message mechanism be disabled.

Image Server	
Lookup Method	Specifies how the ImageServer looks for the server address. • **Static IP** • **DNS** NOTE: You must set the **Integrated NIC to Enable with ImageServer to set the Lookup Method.**
ImageServer IP	Specifies the primary static IP address of the ImageServer with which the client software communicates.

	The default IP address is **255.255.255.255** NOTE: You must set the **Integrated NIC to Enable with ImageServer to set the ImageServer IP.**
ImageServer Port	Specifies the primary IP port of the image server with which the client software communicates. The default IP port is **06910.**
Client DHCP	Specifies how the client obtains the IP address. • **Static IP** • **DHCP** (default)
Client IP	Specifies the static IP address of the client. The default IP address is **255.255.255.255** NOTE: To set the Client IP you must set the Client DHCP to the Static IP
Client SubnetMask	Specifies the subnet mask for the client. The default setting is **255.255.255.255** NOTE: To set **Client Subnet Mask you must set Client DHCP to Static IP**
Client Gateway	Specifies the gateway IP address for the client. The default setting is **255.255.255.255** NOTE: To set **Client Subnet Mask you must set Client DHCP to Static IP**
License Status	Displays the current license status.

Post Behavior	
Fast Boot	When enabled (default), your computer starts more quickly because it skips certain configurations and tests.
NumLock LED	Enables or disables the NumLock feature when your computer starts. When enabled (default), this option activates the numeric and mathematical features shown at the top of each key. When disabled, this option activates the cursor-control functions labeled on the bottom of each key
POST Hotkeys	Allows you to specify the function keys to display on the screen when the computer starts. • **Enable F2 = Setup** (enabled by default) • **Enable F12 = Boot menu** (enabled by default)
Keyboard Errors	Enables or disables keyboard error reporting when the computer starts. This option is enabled by default.
MEBx Hotkey	sign-on displays a message stating the keystroke sequence required to enter the Manageability Engine BIOS Extensions(MEBx) Setup program. This option is enabled by default.
OS Install	Set the system maximum memory for OS to load while installation. If enabled the maximum available memory is 256MB RAM. This option is disable by default. Reason being some operating system will not complete install with more then 2GB of system memory.

System Logs	
BIOS Events	Displays the system event log and allows you to: • **Clear Log** • **Mark all Entries**

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Cover

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Cover

NOTE: You may need to install Adobe Flash Player from **Adobe.com** to view the following illustrations.

1. Follow the procedures in Before Working Inside Your Computer.
2. Pull back the cover release latch.

3. Tilt the cover outward from the top, and then remove the cover from the computer.

Replacing the Cover

To replace the cover, perform the steps above in reverse order.

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Primary Hard Drive

Dell™ OptiPlex™ 780 Service Manual—Desktop

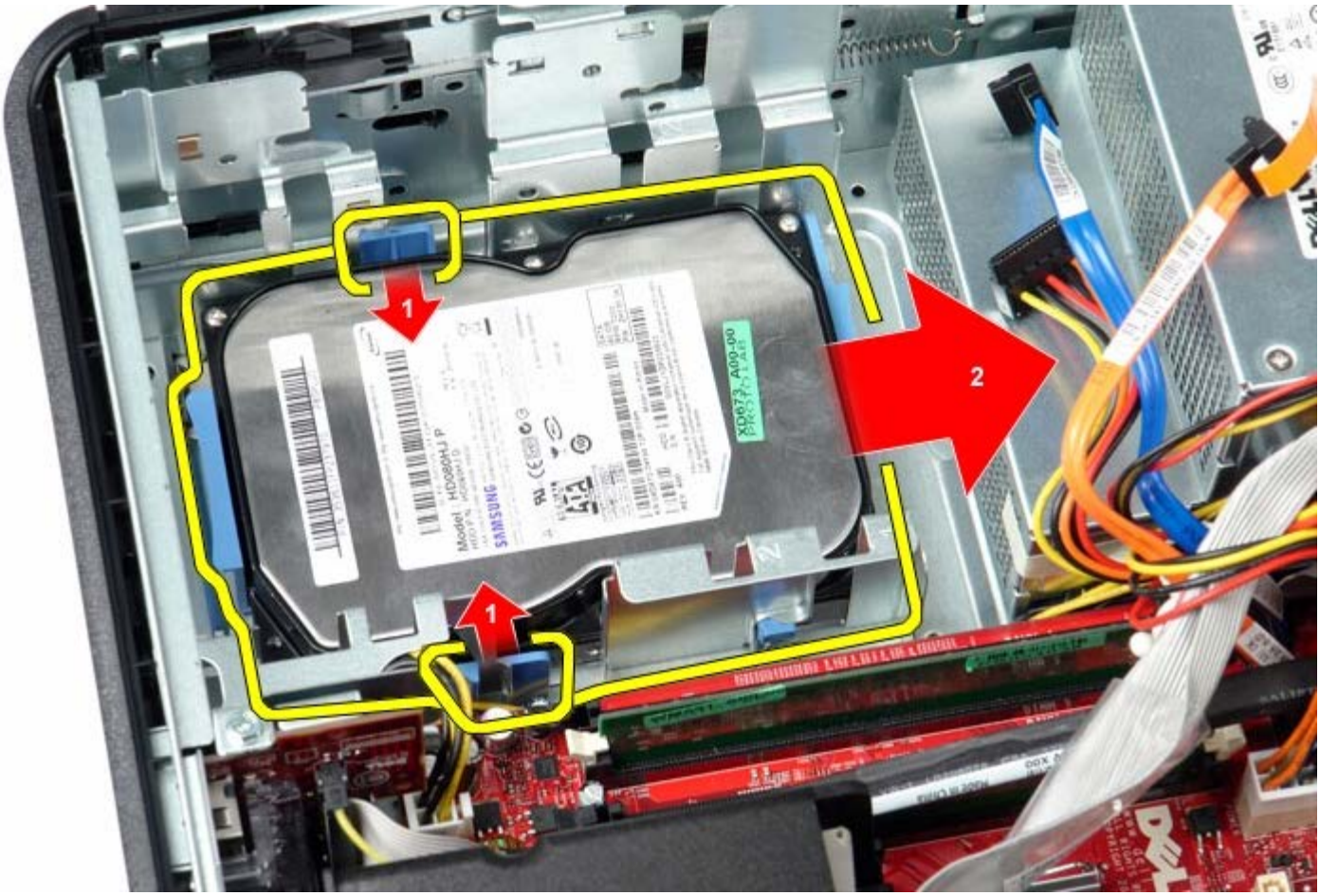
WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Primary Hard Drive

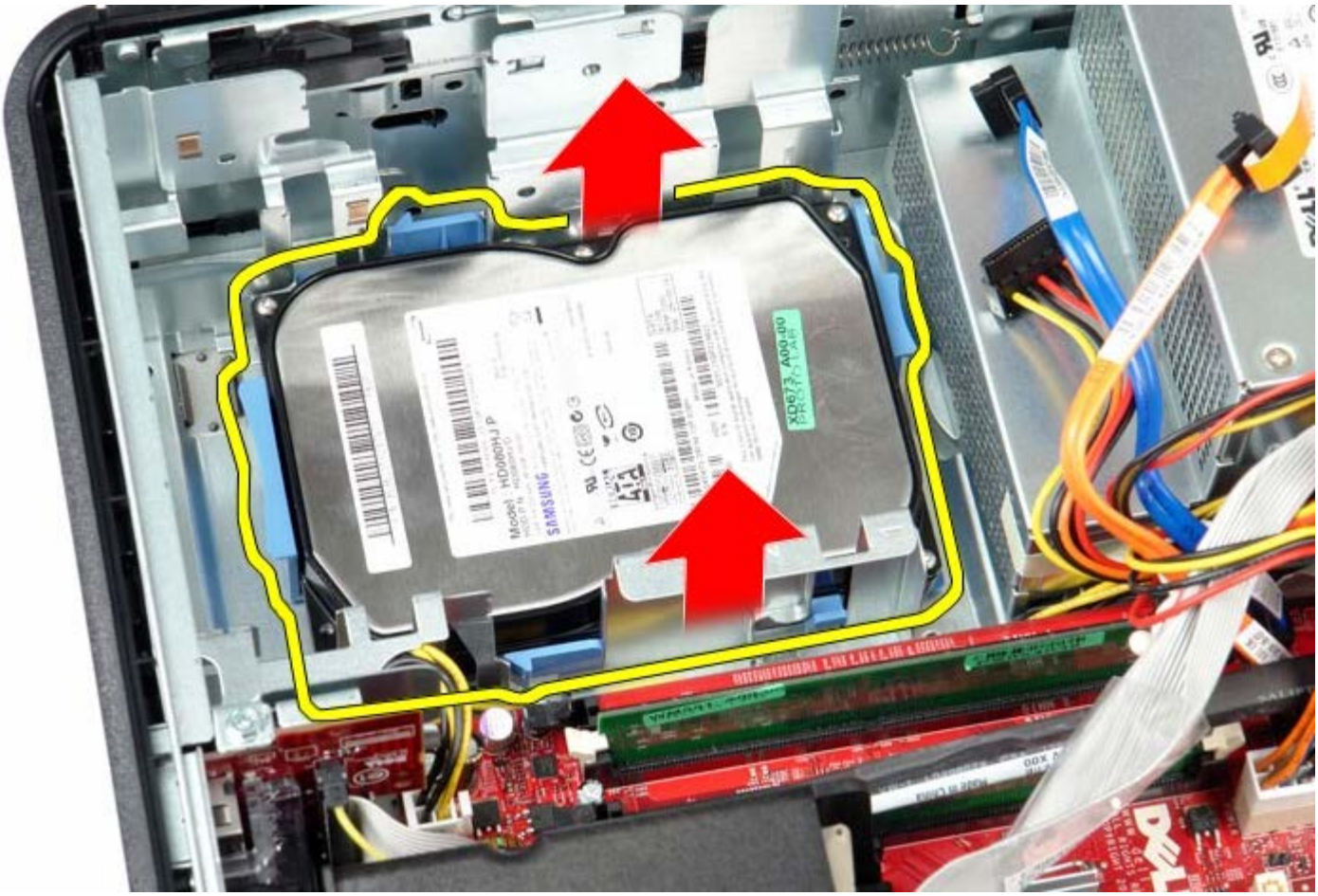
1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the optical drive from the computer.
3. If present, remove the secondary hard drive from the computer.
4. Disconnect the hard-drive data cable.

5. Disconnect the hard-drive power cable.

6. Press in on the blue securing tabs on each side of the drive, and then slide the drive towards the back of the computer.



7. Lift the hard drive and remove it from the system.



Replacing the Primary Hard Drive

To replace the hard drive, perform the above steps in reverse order.

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Floppy Drive

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

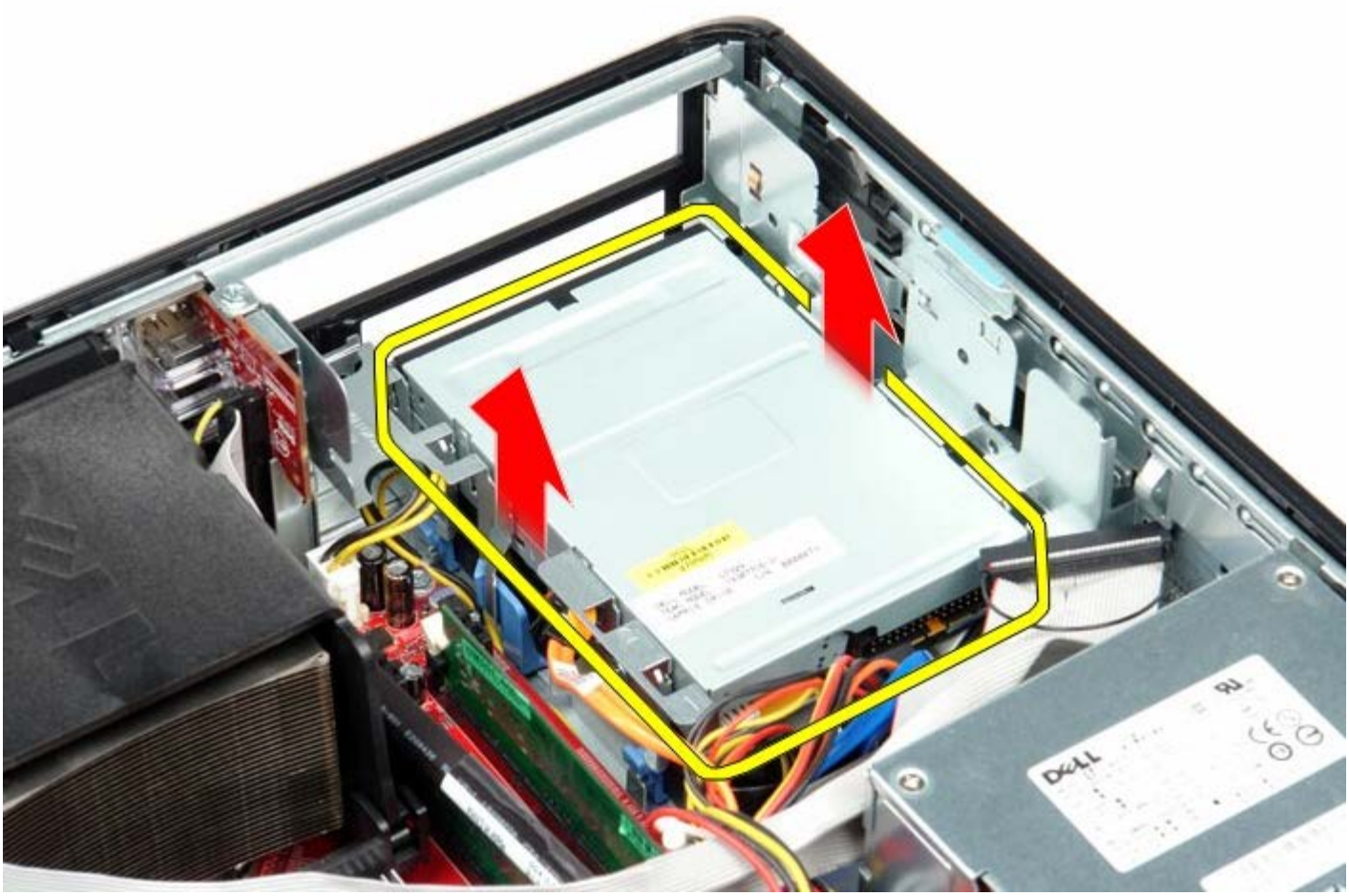
Removing the Floppy Drive

1. Follow the procedures in Before Working Inside Your Computer.
2. Disconnect the floppy-drive data cable.

3. Disconnect the floppy-drive power cable.

4. Pull up on the drive-release latch, and then slide the floppy drive towards the back of the computer.

5. Lift the floppy drive up and away from the computer.



Replacing the Floppy Drive

To replace the floppy drive, peform the above steps in reverse order.

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Expansion Card(s)

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Expansion Card(s)

1. Follow the procedures in Before Working Inside Your Computer.
2. Rotate the release tab on the card-retention latch upwards.
3. Gently pull the release lever away from the card and then ease the card up and out of its connector on the system board.

Replacing the Expansion Card(s)

To replace the expansion card, perform the above steps in reverse order.

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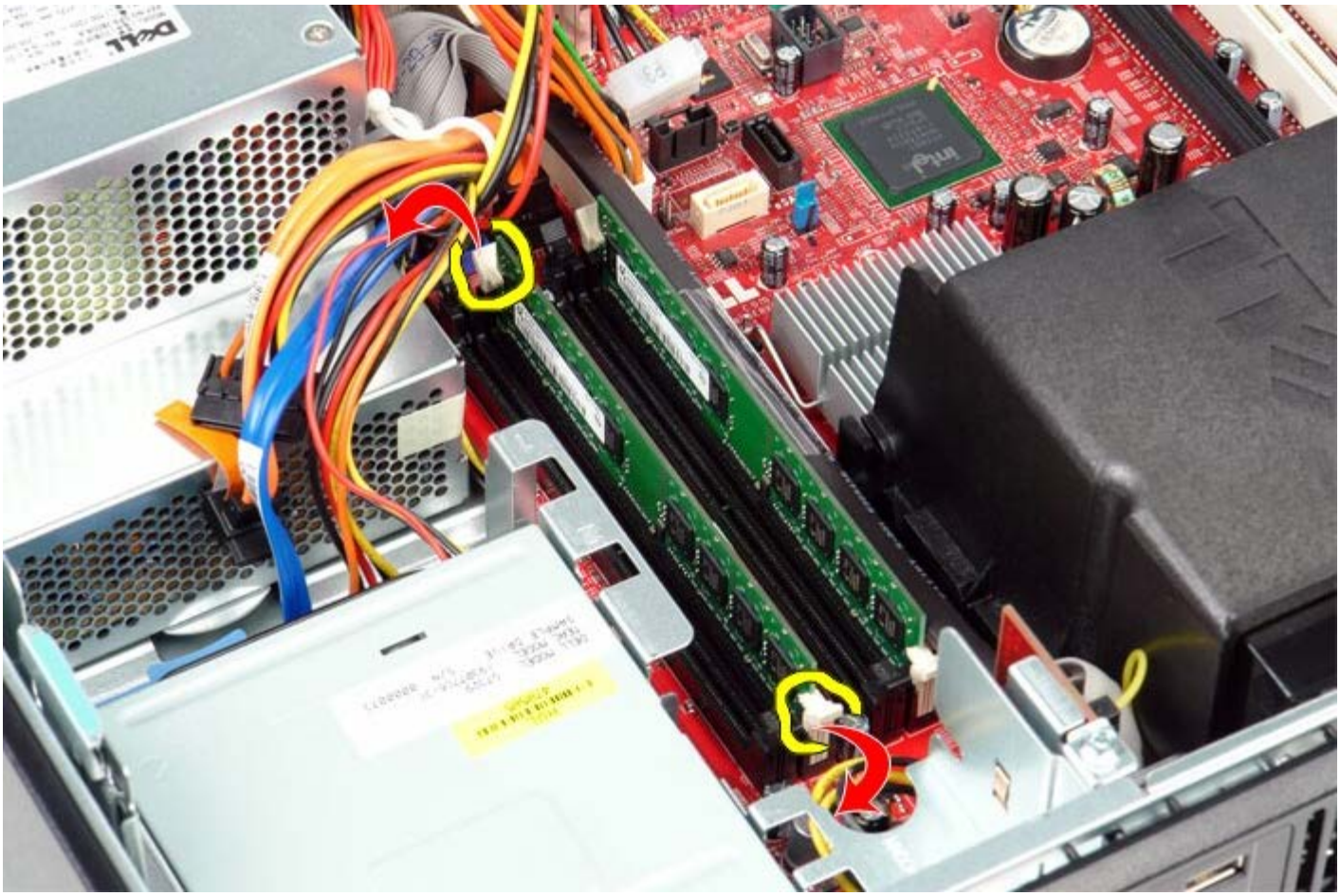
Memory

Dell™ OptiPlex™ 780 Service Manual—Desktop

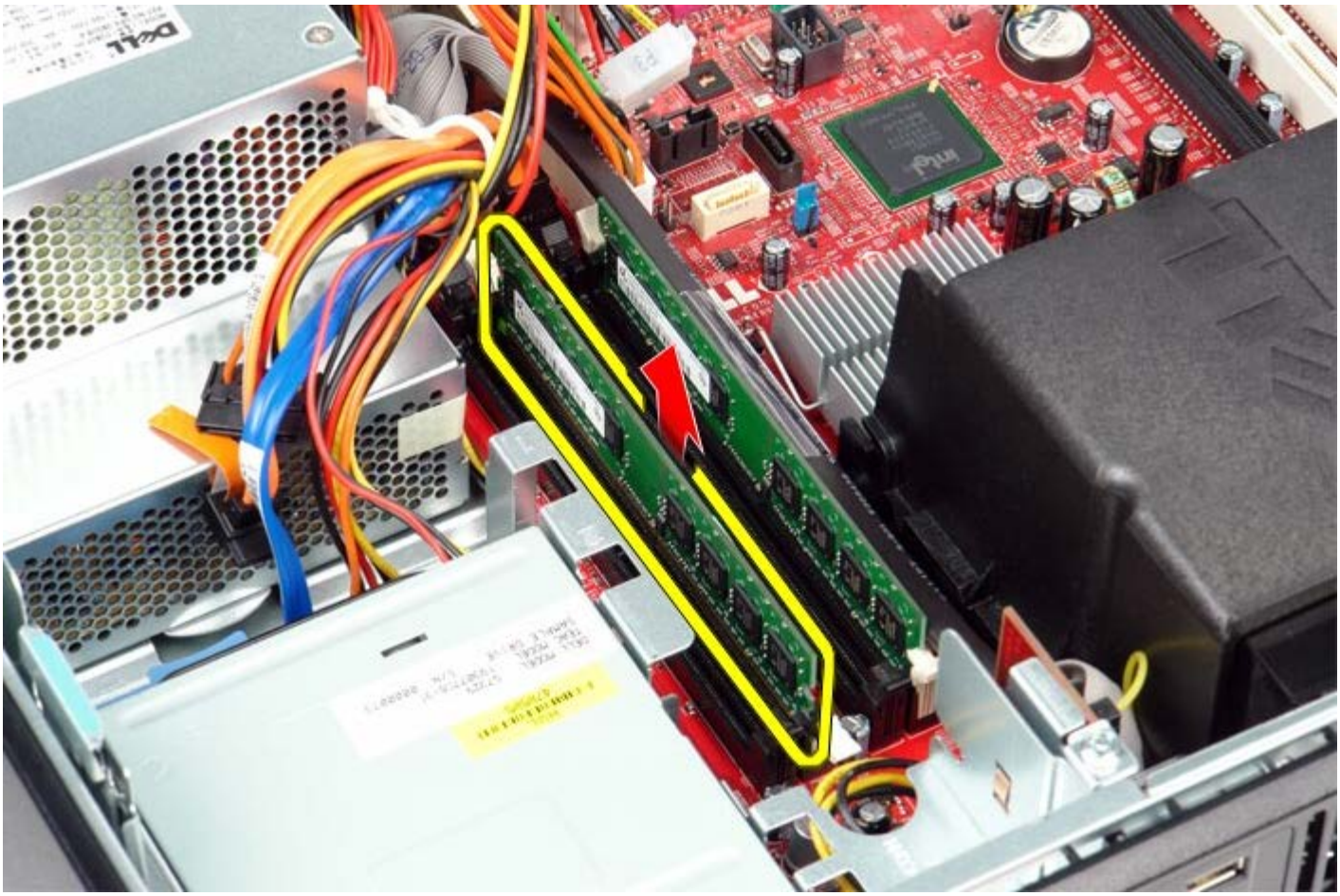
WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Memory Module(s)

1. Follow the procedures in Before Working Inside Your Computer.
2. Press out on the securing clips at each end of the memory module connector.



3. Lift the memory module out of the connector and remove it from the computer.



Replacing the Memory Module(s)

To replace the memory module(s), perform the above steps in reverse order.

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Power Supply

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Power Supply

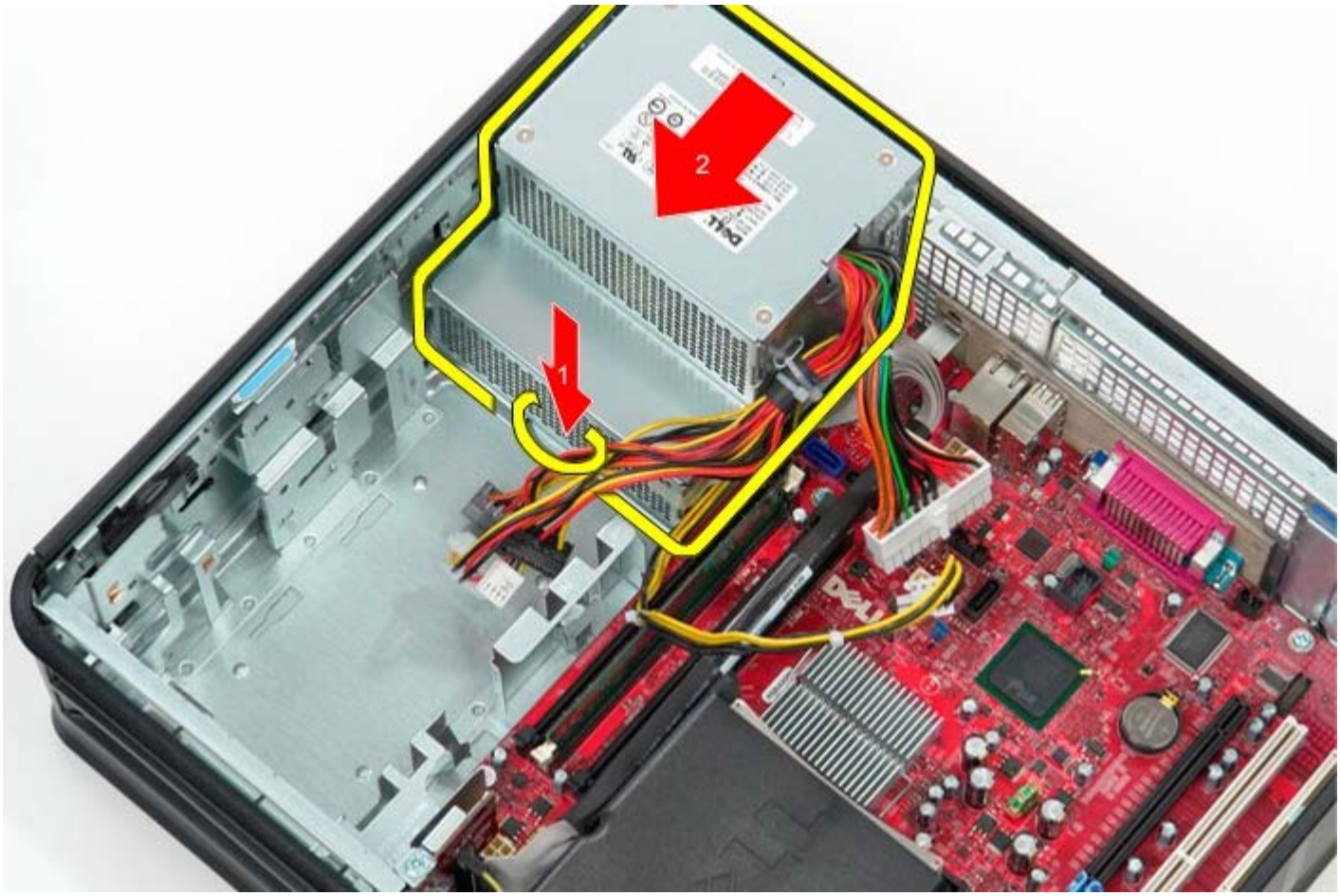
1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the optical drive.
3. Remove the secondary hard drive (if present).
4. Remove the hard drive.
5. Disconnect the main power connector from the system board.

6. Disconnect the processor power connector from the system board.

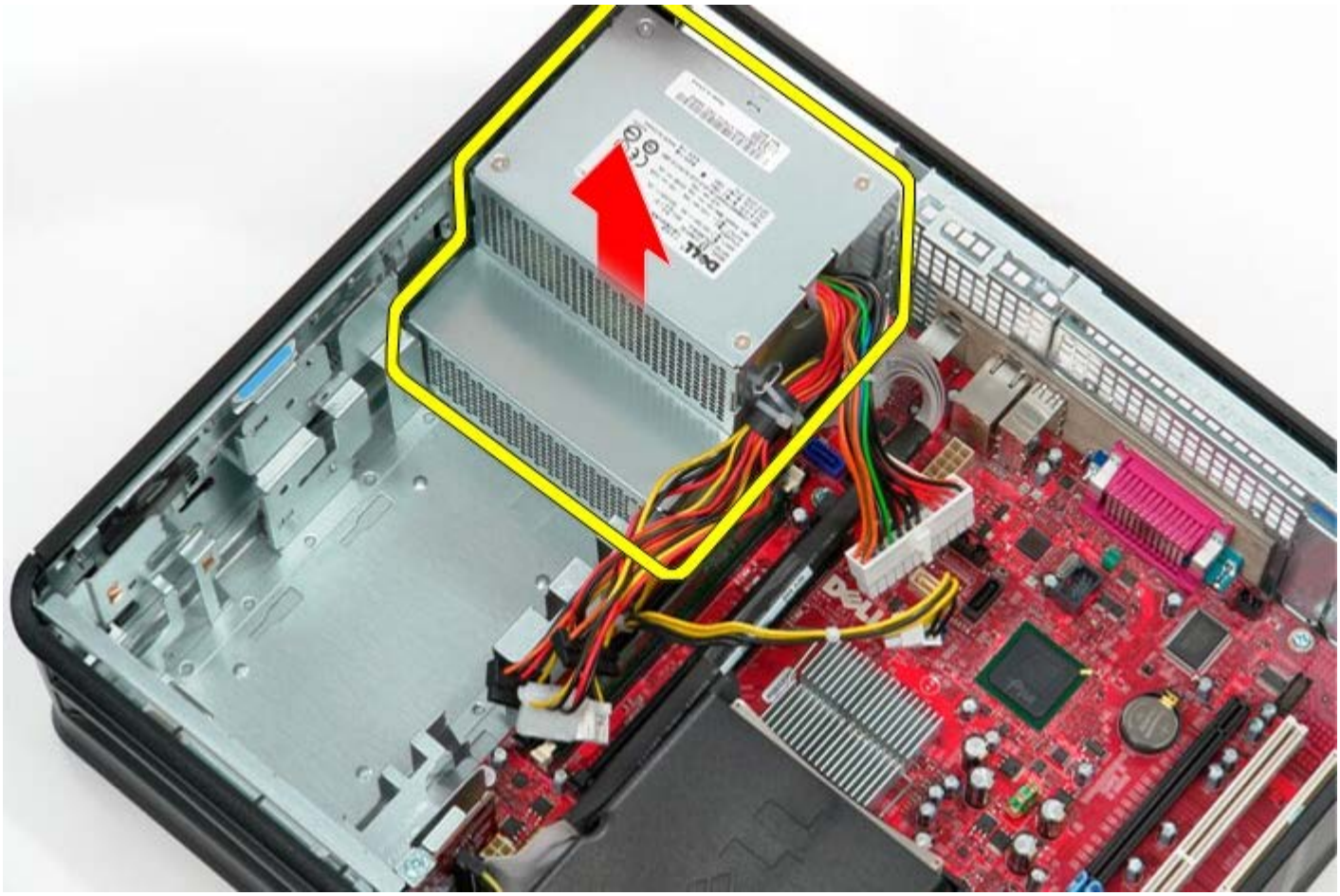
7. Release the processor power connector cable from routing guides under the system board.

8. Remove the screws that secure the power supply to the back of the chassis.

9. Press the power supply release latch at the bottom of the chassis and then slide the power supply towards the front of the computer.



10. Lift the power supply up and away from the computer.



Replacing the Power Supply

To replace the power supply, perform the above steps in reverse order.

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Fan

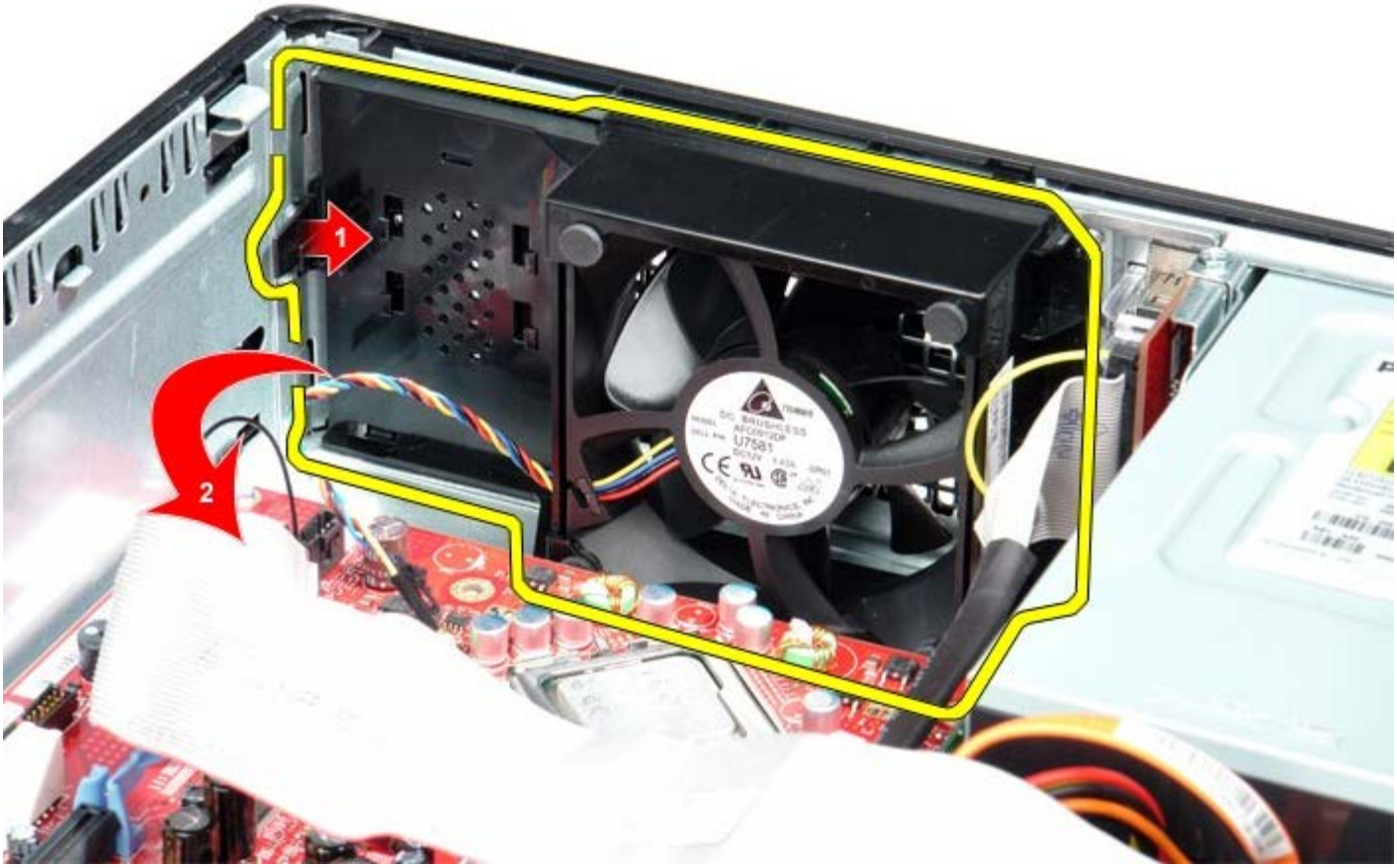
Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

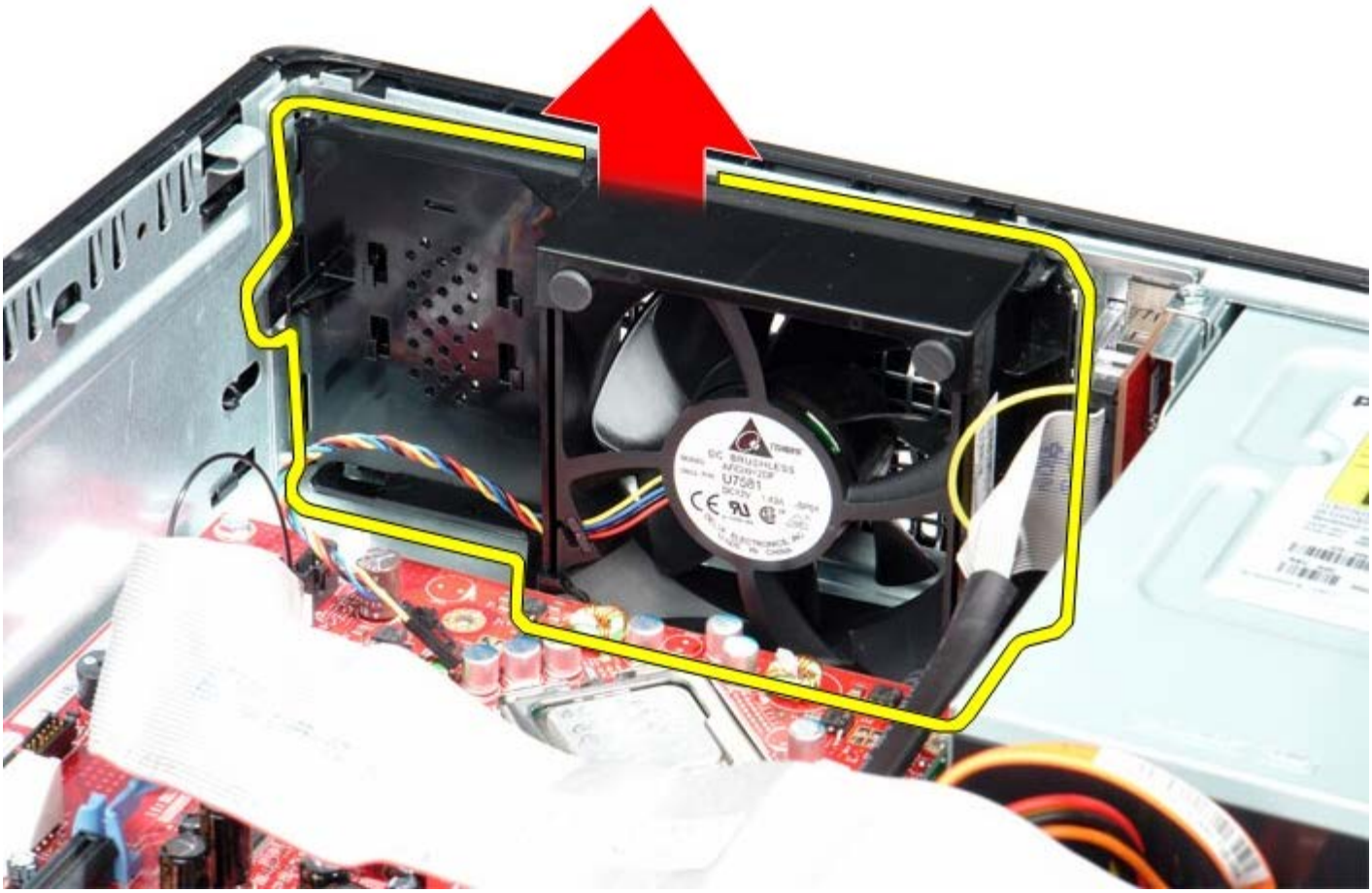
Removing the Fan

1. Follow the procedures in Before Working Inside Your Computer.
2. Disconnect the fan power cable from the system board.

3. Pull out the fan retention tab, and then shift the fan towards the system board.



4. Lift the fan and remove it from the computer.



Replacing the Fan

To replace the fan, perform the above steps in reverse order.

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System Board

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the System Board

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the riser cage.
3. Remove the heat sink and processor.
4. Remove the memory.
5. Disconnect the floppy-drive data cable from the system board.

6. Disconnect the fan power cable.

7. Disconnect the main power cable from the system board.

8. Disconnect the IO-panel cable.

9. Disconnect the optical-drive data cable from the system board.

10. Disconnect the hard-drive data cable from the system board.

11. Disconnect the processor power cable.

12. Remove the screws that secure the system board to the computer chassis.

13. Remove the heat sink assembly bracket.

14. To remove the system board, slide the system board towards the back of the computer and lift the system board up and away from the computer.

Replacing the System Board

To replace the system board, perform the above the steps in reverse order.

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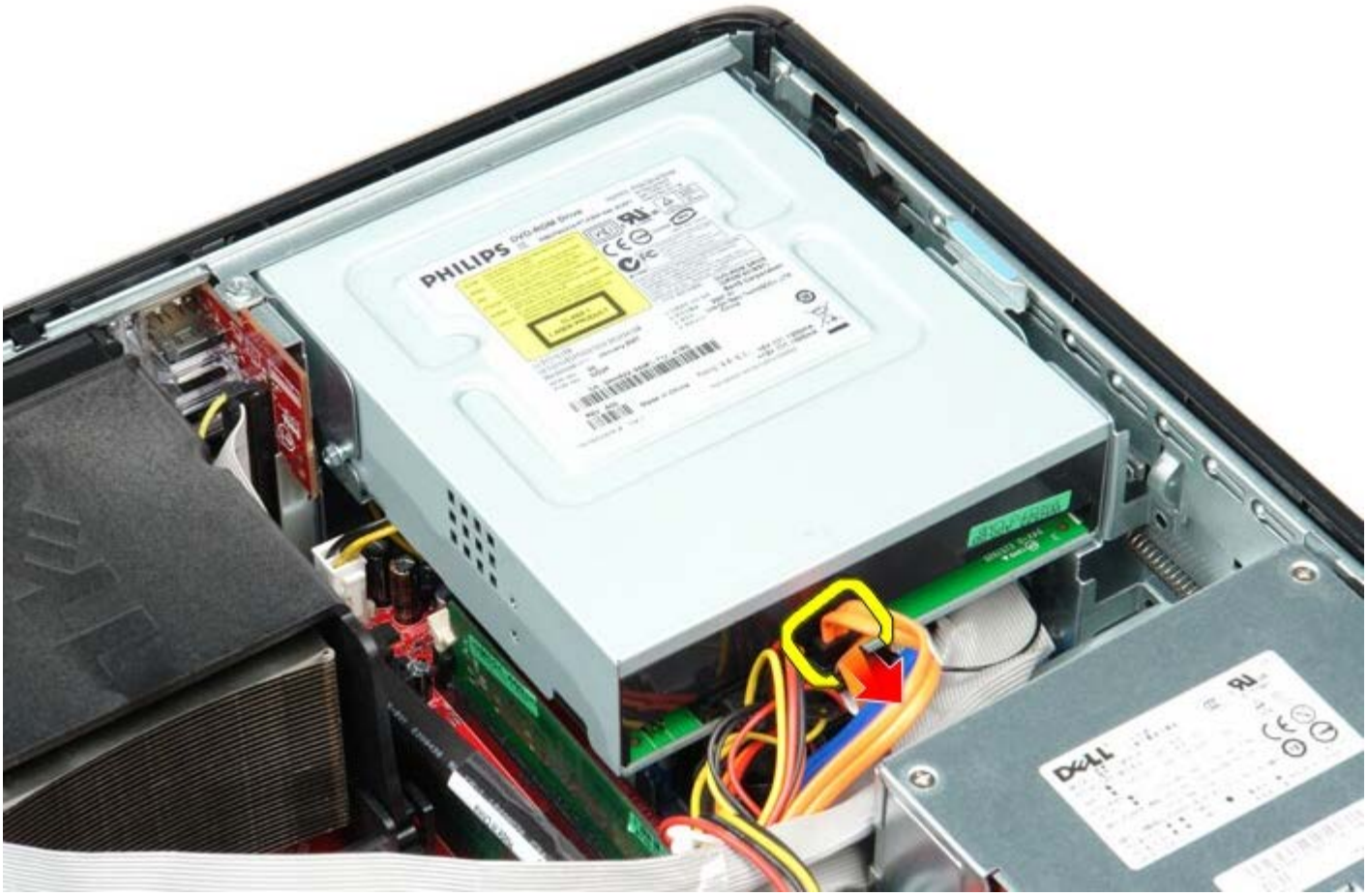
Optical Drive

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Optical Drive

1. Follow the procedures in Before Working Inside Your Computer.
2. Disconnect the optical-drive data cable.



3. Disconnect the optical-drive power cable.

4. Lift the drive-release latch, and then slide the drive towards the back of the computer.

5. Lift and remove the drive from the computer.

Replacing the Optical Drive

To replace the optical drive, perform the steps above in reverse order.

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Secondary Hard Drive (Optional)

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Secondary Hard Drive (Optional)

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the optical drive from the computer.
3. Disconnect the hard-drive data cable.

4. Disconnect the hard-drive power cable.

5. Pull up on the release latch, and then slide the hard drive towards the back of the computer.

6. Lift the hard drive and remove it from the computer.

Replacing the Secondary Hard Drive

To replace the secondary hard drive, perform the above steps in reverse order.

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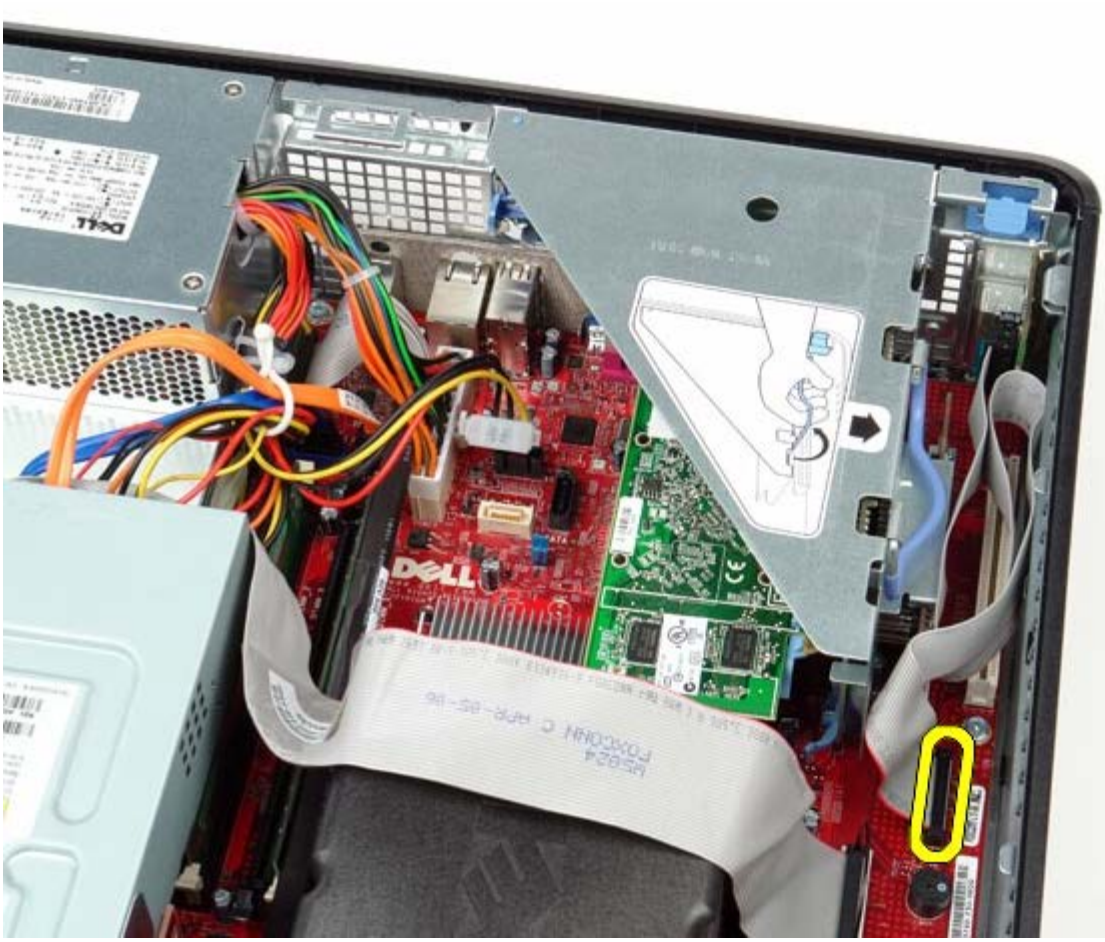
Riser Cage

Dell™ OptiPlex™ 780 Service Manual—Desktop

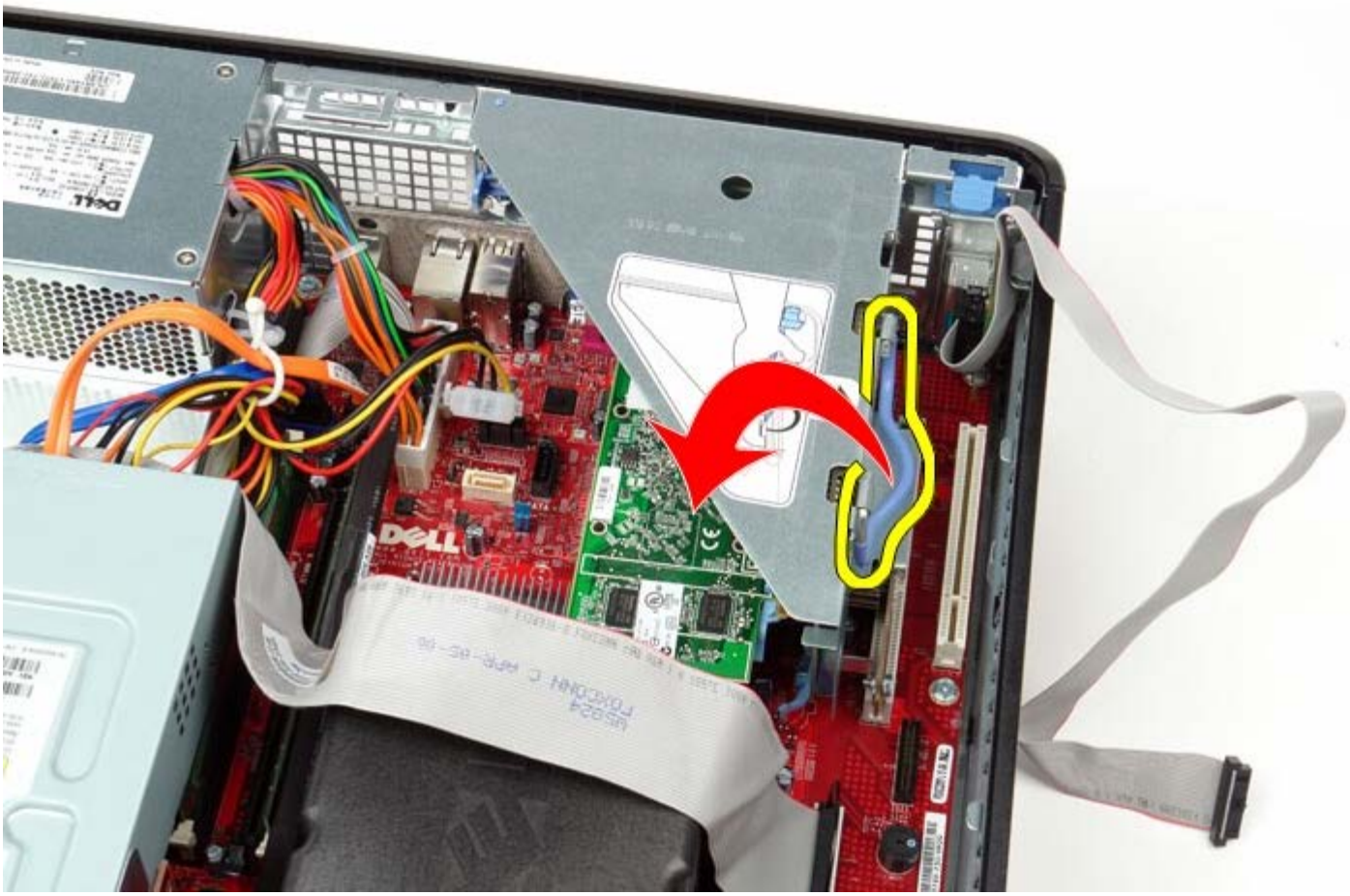
WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Riser Cage

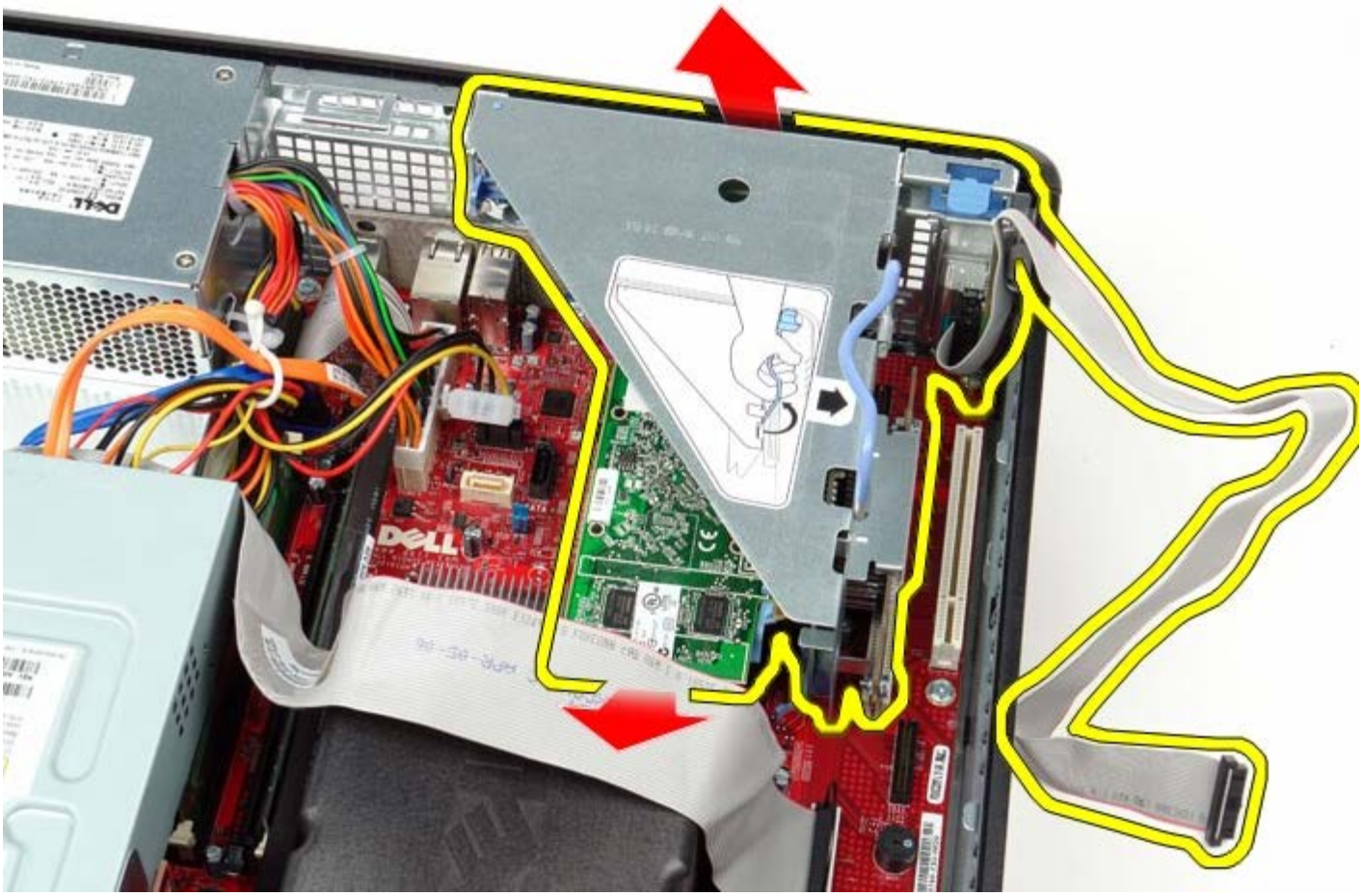
1. Follow the procedures in Before Working Inside Your Computer.
2. Disconnect the PS/2 serial-port cable from the system board.



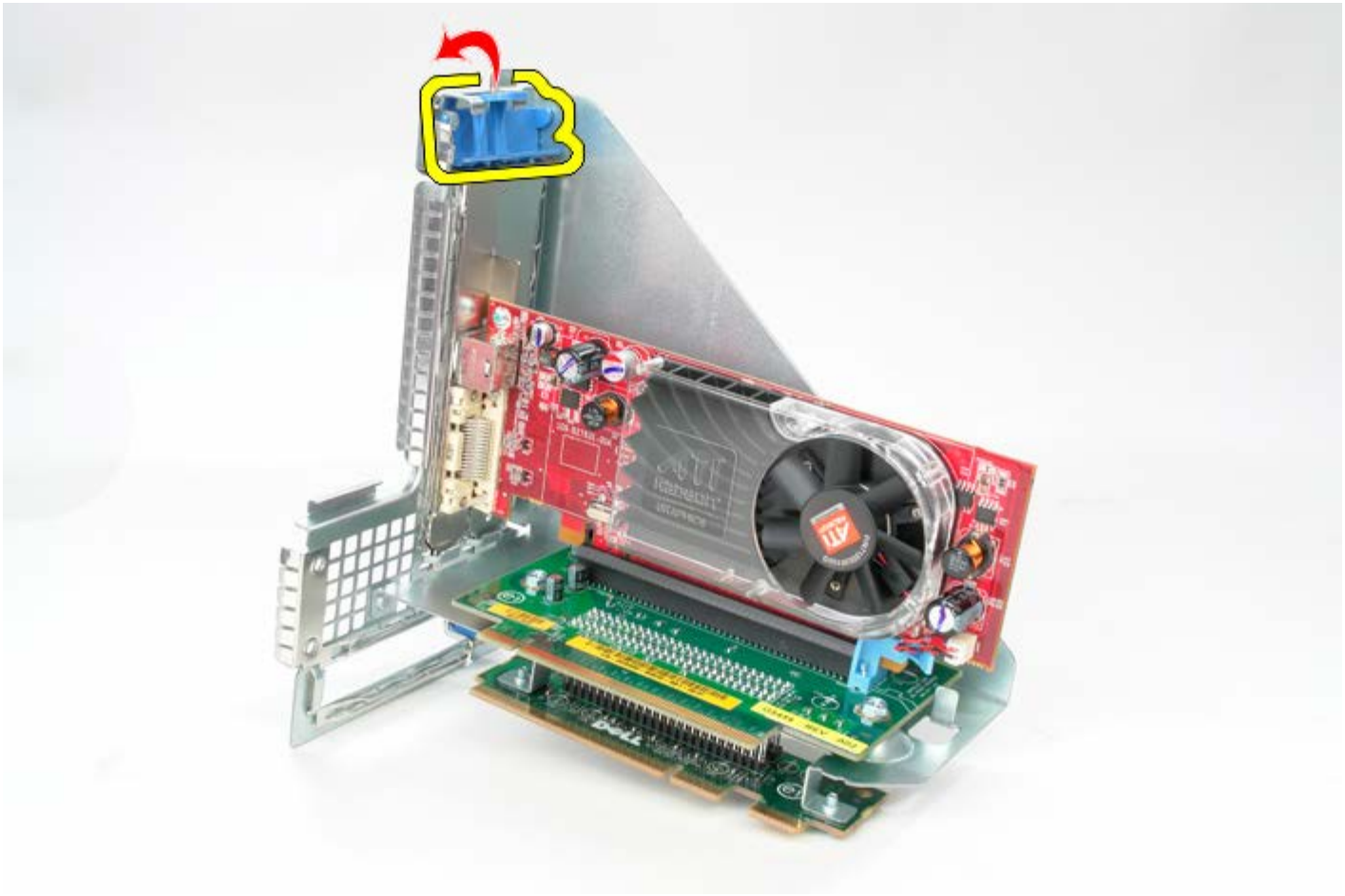
3. Pivot the riser-cage handle to an upright position.



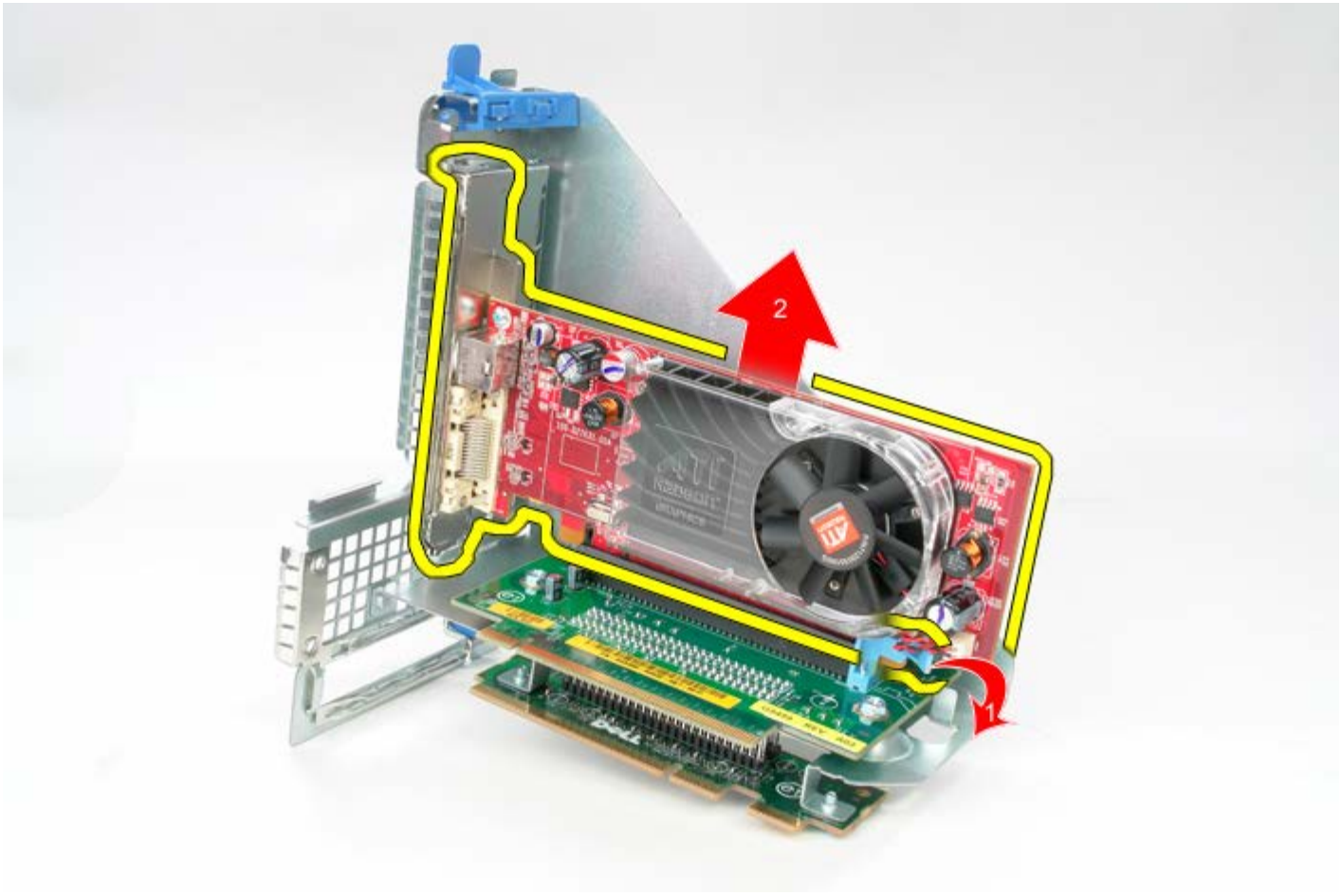
4. Gently pull the riser-cage handle and lift the riser cage up and away from the computer.



5. On the riser cage, rotate the card retention latch upward.



6. Gently pull the card release latch on the riser board away from the card and ease the card out of its connector.



Replacing the Riser Cage

To replace the riser cage, perform the above steps in reverse order.

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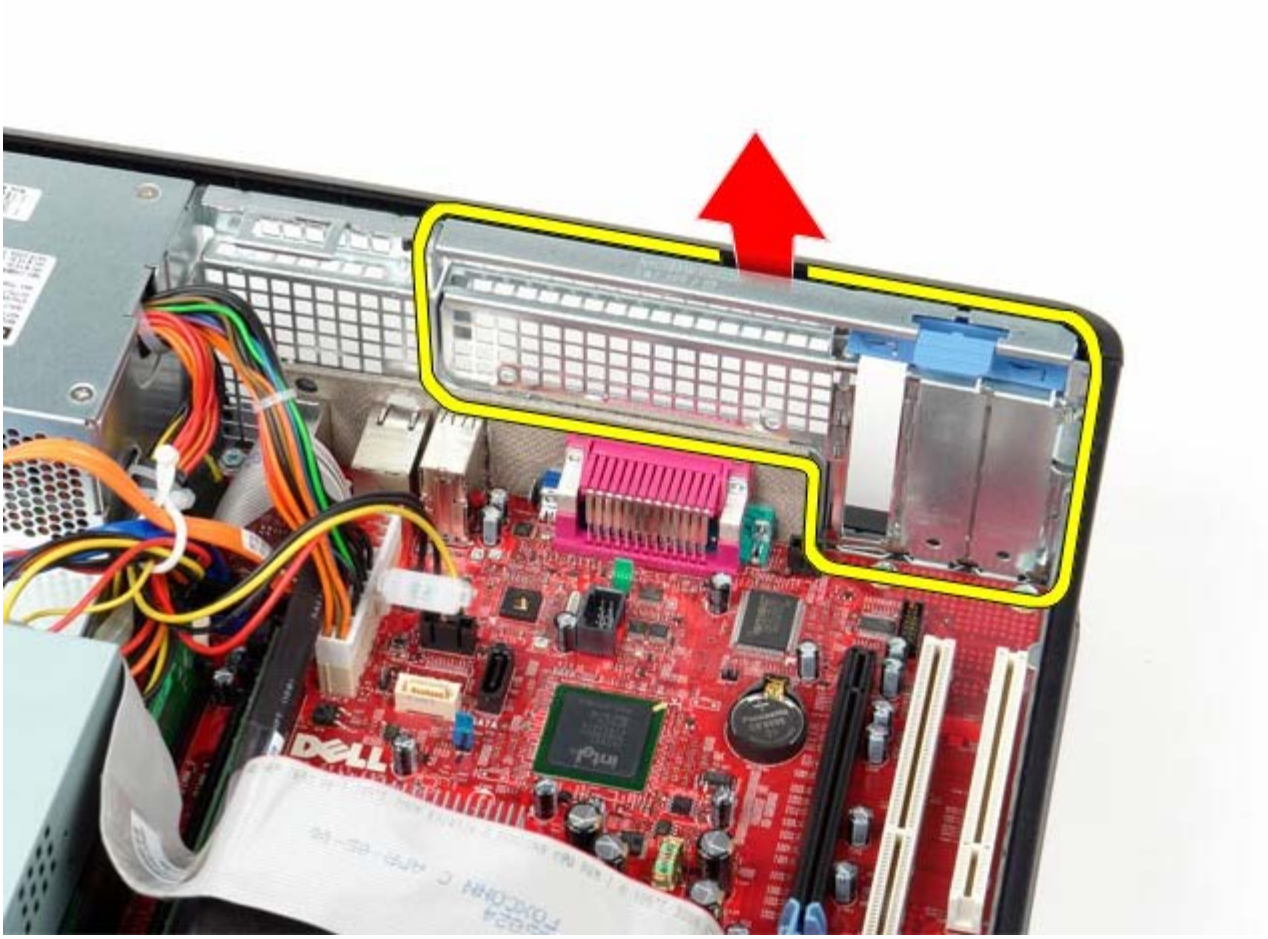
Standard Back Plate

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Standard Back Plate

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the riser cage.
3. Gently lift the standard back plate and remove from the computer.



Replacing the Standard Black Plate

To replace the standard black plate, perform the above steps in reverse order.

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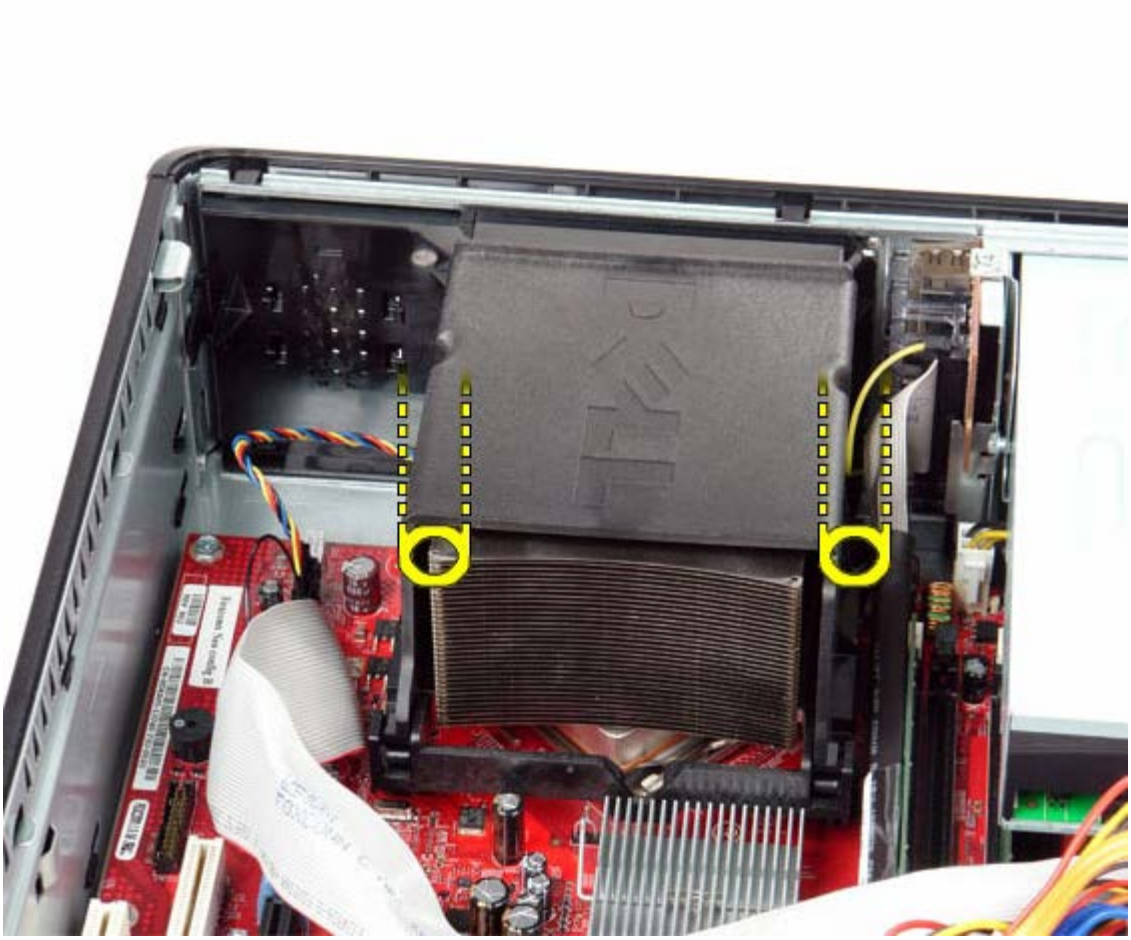
Heat Sink and Processor

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

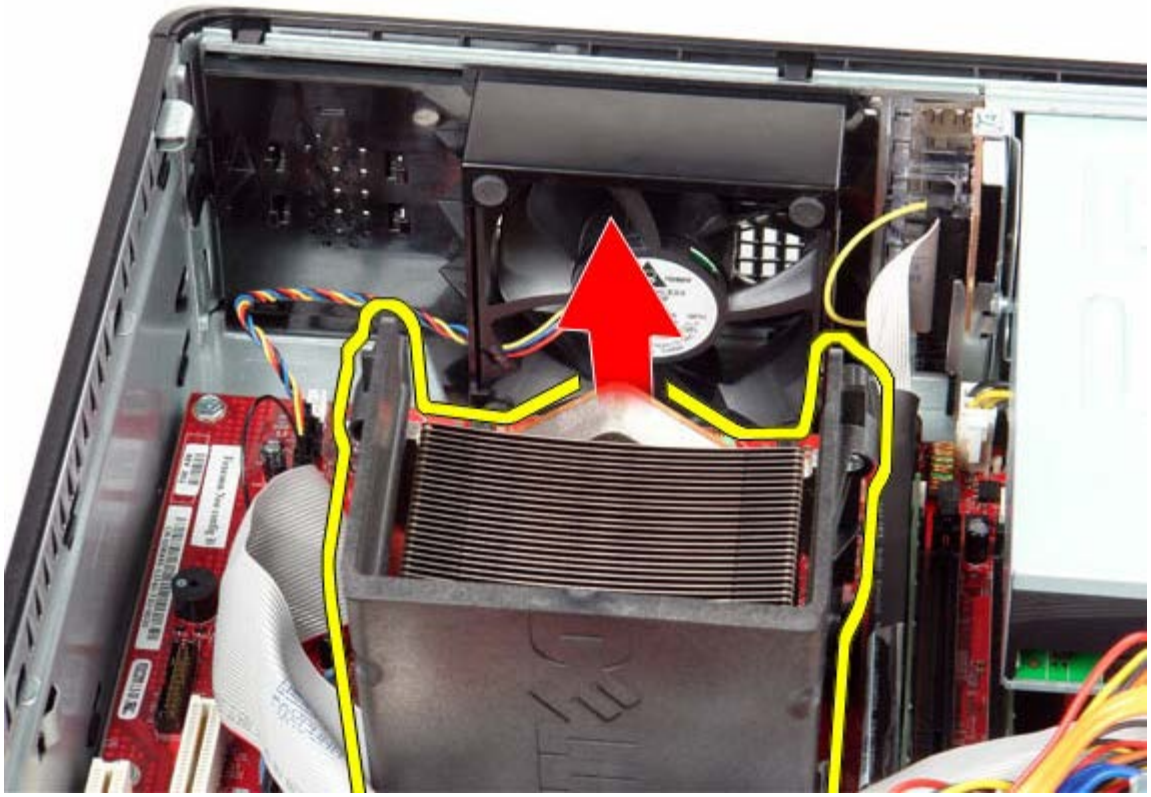
Removing the Heat Sink and Processor

1. Follow the procedures in Before Working Inside Your Computer.
2. Loosen the captive screws on each side of the heat sink.

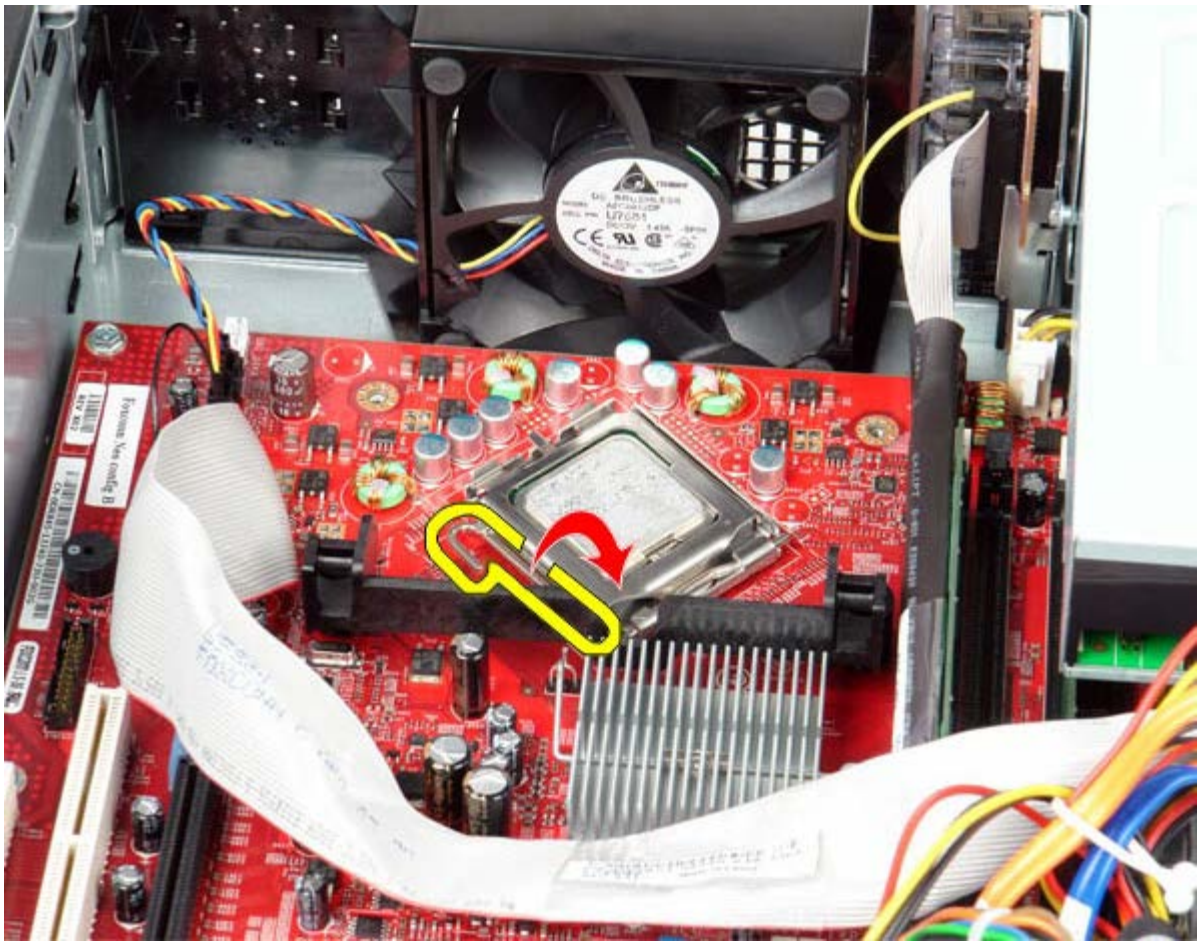


3. Rotate the heat sink upwards.

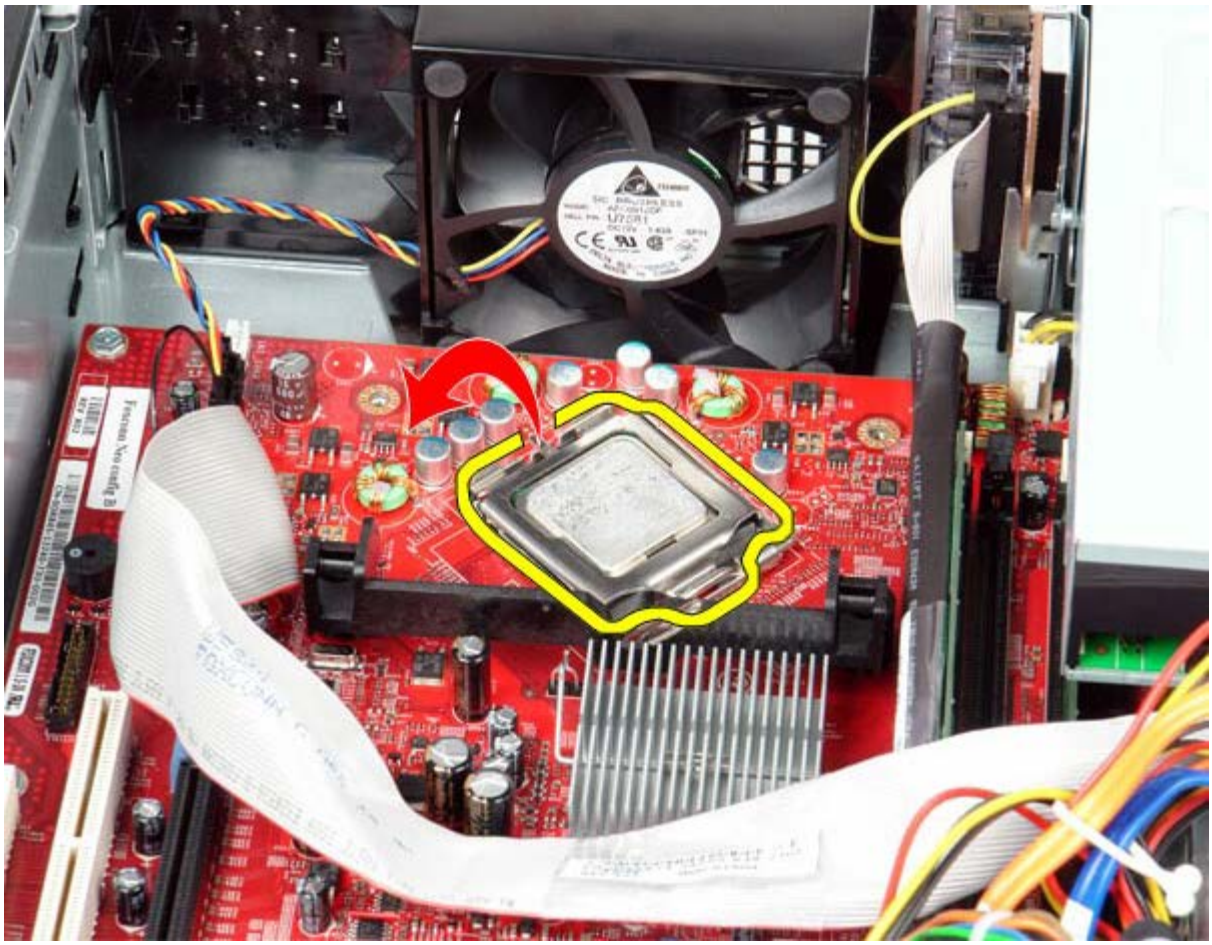
4. Lift the heat sink and remove it from the computer.



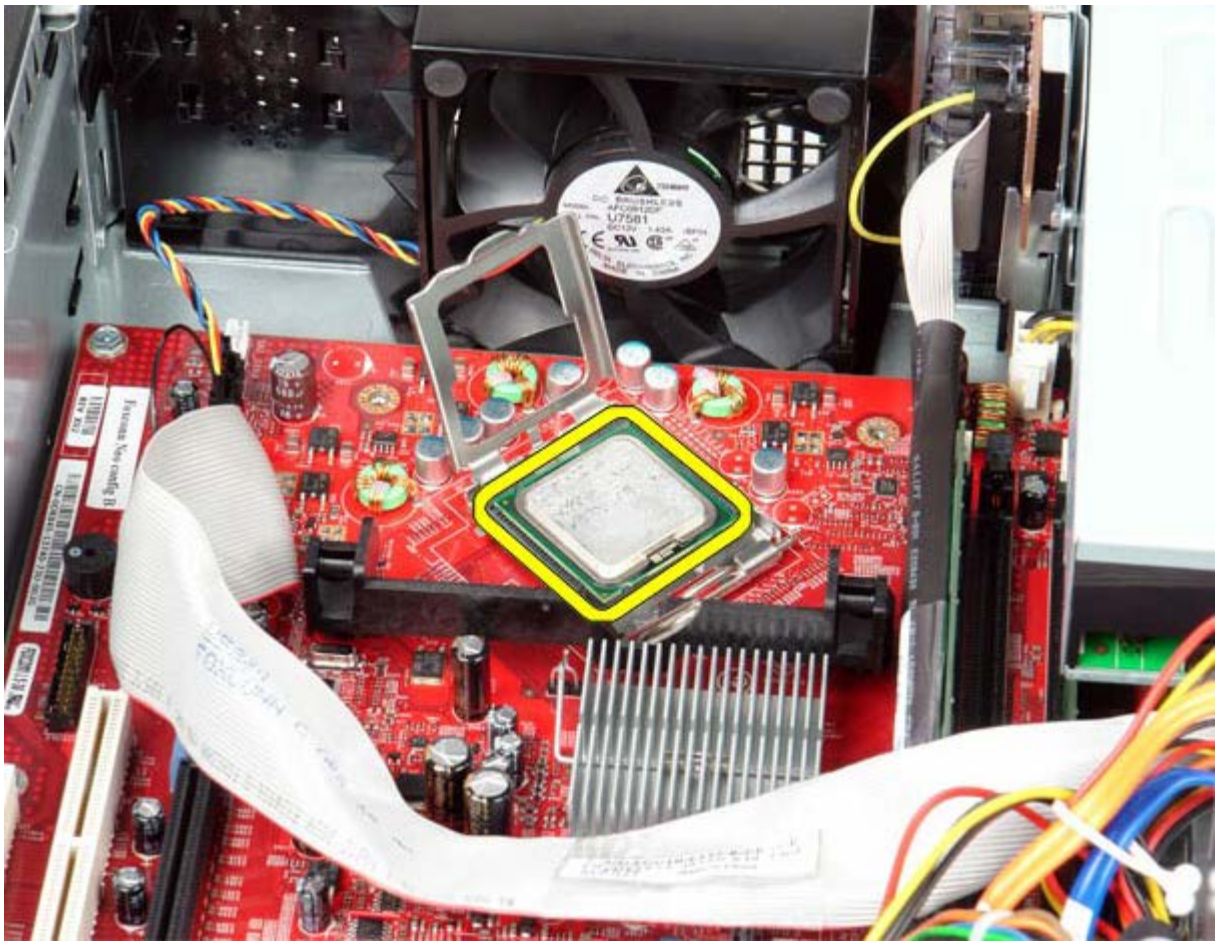
5. Open the processor cover by sliding the release lever from under the cover latch on the socket. Then, pull the lever back to release the processor cover.



6. Lift the processor cover.



7. Remove the processor from the computer.



△ **CAUTION: When replacing the processor, do not touch any of the pins inside the socket or allow any objects to fall on the pins in the socket.**

Replacing the Heat Sink and Processor

To replace the heat sink and processor, perform the above steps in reverse order.

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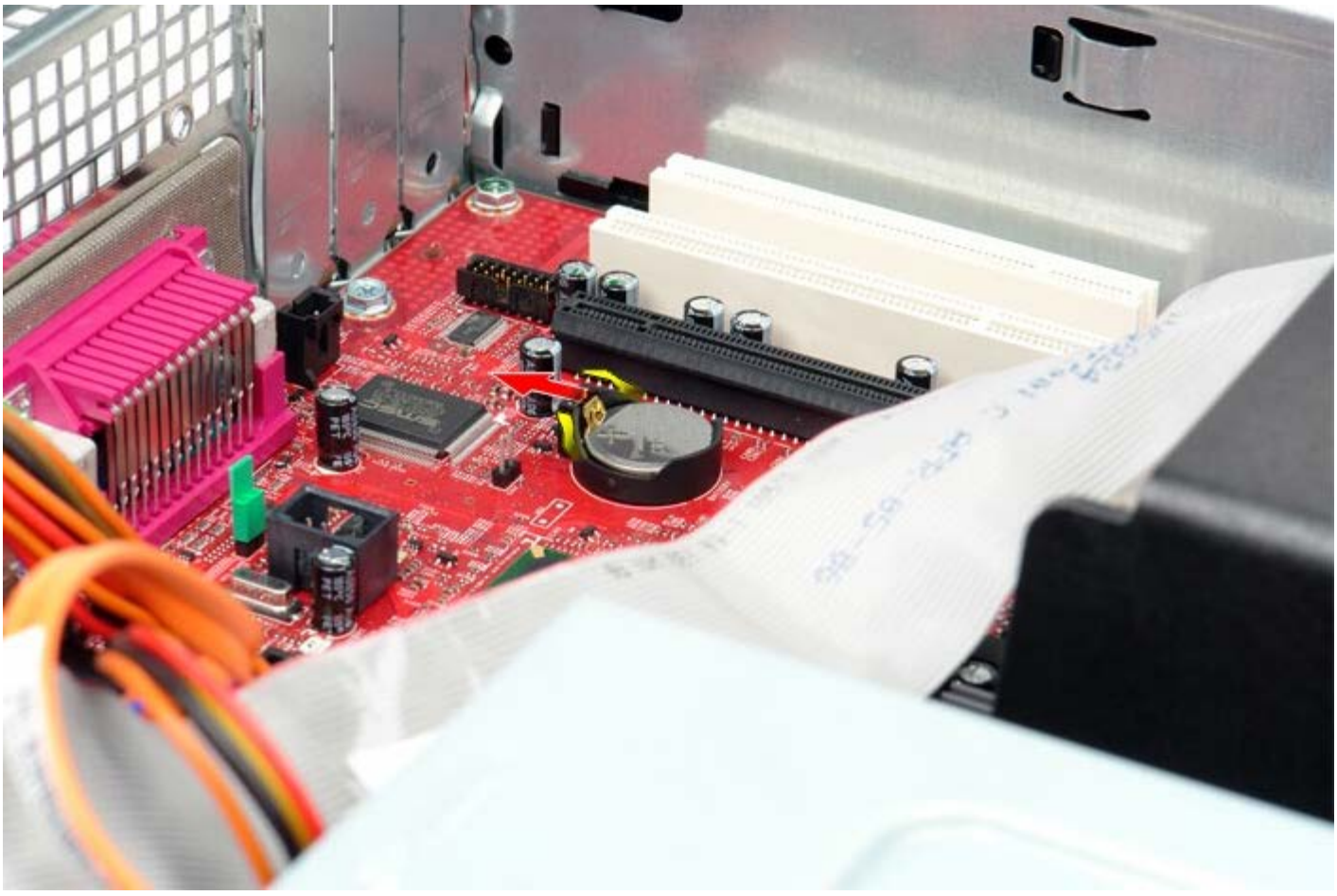
Coin-Cell Battery

Dell™ OptiPlex™ 780 Service Manual—Desktop

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the Coin-Cell Battery

1. Follow the procedures in Before Working Inside Your Computer.
2. Pull the retention clip away from the coin-cell battery.



3. Remove the coin-cell battery from the system.

Replacing the Coin-Cell Battery

To replace the coin-cell battery, perform the above steps in reverse order.

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IO Panel

Dell™ OptiPlex™ 780 Service Manual—Desktop

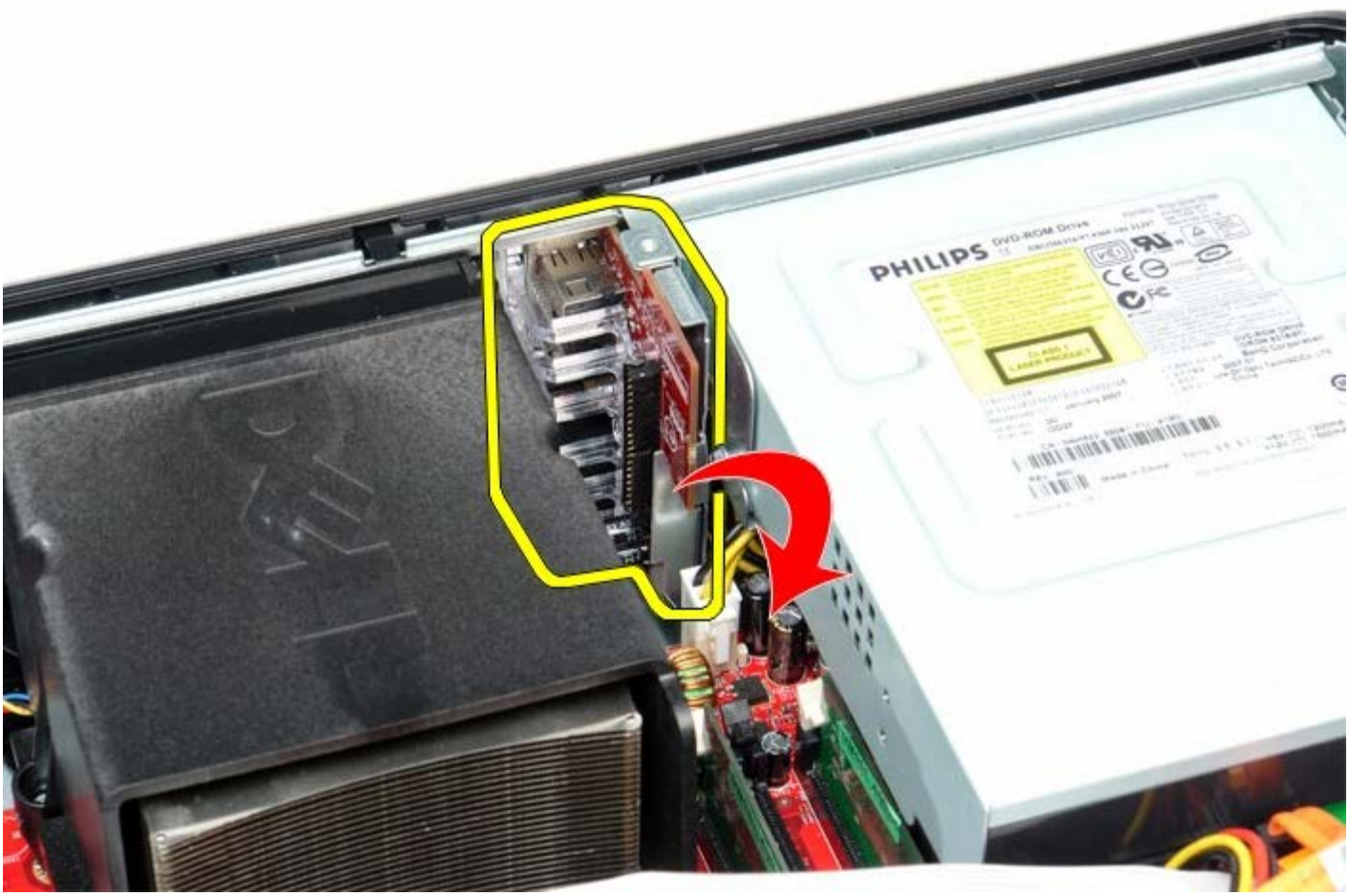
WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

Removing the IO Panel

1. Follow the procedures in Before Working Inside Your Computer.
2. Disconnect and remove the IO-panel cable.

3. Remove the screw that secures the IO panel to the computer.

4. Gently rotate the IO panel away from the computer and then remove it from the computer.



Replacing the IO Panel

To replace the IO panel, perform the above steps in reverse order.

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