

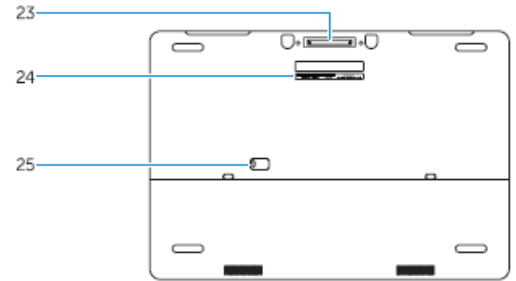
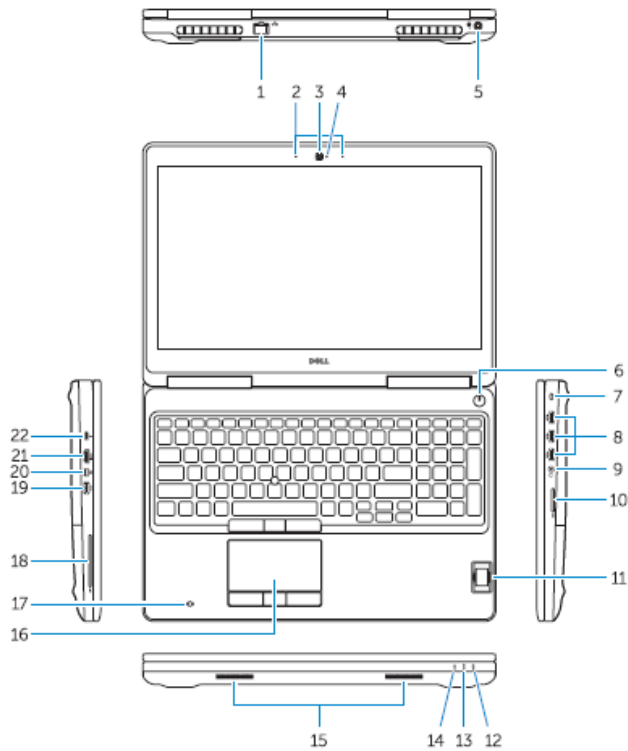
DELL PRECISION™ 7000 SERIES (7510 & 7710)



Technical
Guidebook



7510 CHASSIS OVERVIEW



- 1. Network connector
- 2. Microphone
- 3. Camera (optional)
- 4. Camera-status light (optional)
- 5. Power connector
- 6. Power button
- 7. Security-cable slot
- 8. USB 3.0 connector
- 9. Headset connector
- 10. Memory card reader
- 11. Fingerprint reader (optional)
- 12. Battery-status light
- 13. Hard-drive activity light
- 14. Power-status light
- 15. Speakers
- 16. Touchpad
- 17. Contactless smartcard reader (optional)
- 18. Smartcard reader (optional)
- 19. USB 3.0 connector
- 20. Mini DisplayPort connector
- 21. HDMI connector
- 22. USB-C connector (optional)
- 23. Docking connector
- 24. Service-tag label
- 25. Door and battery release latch

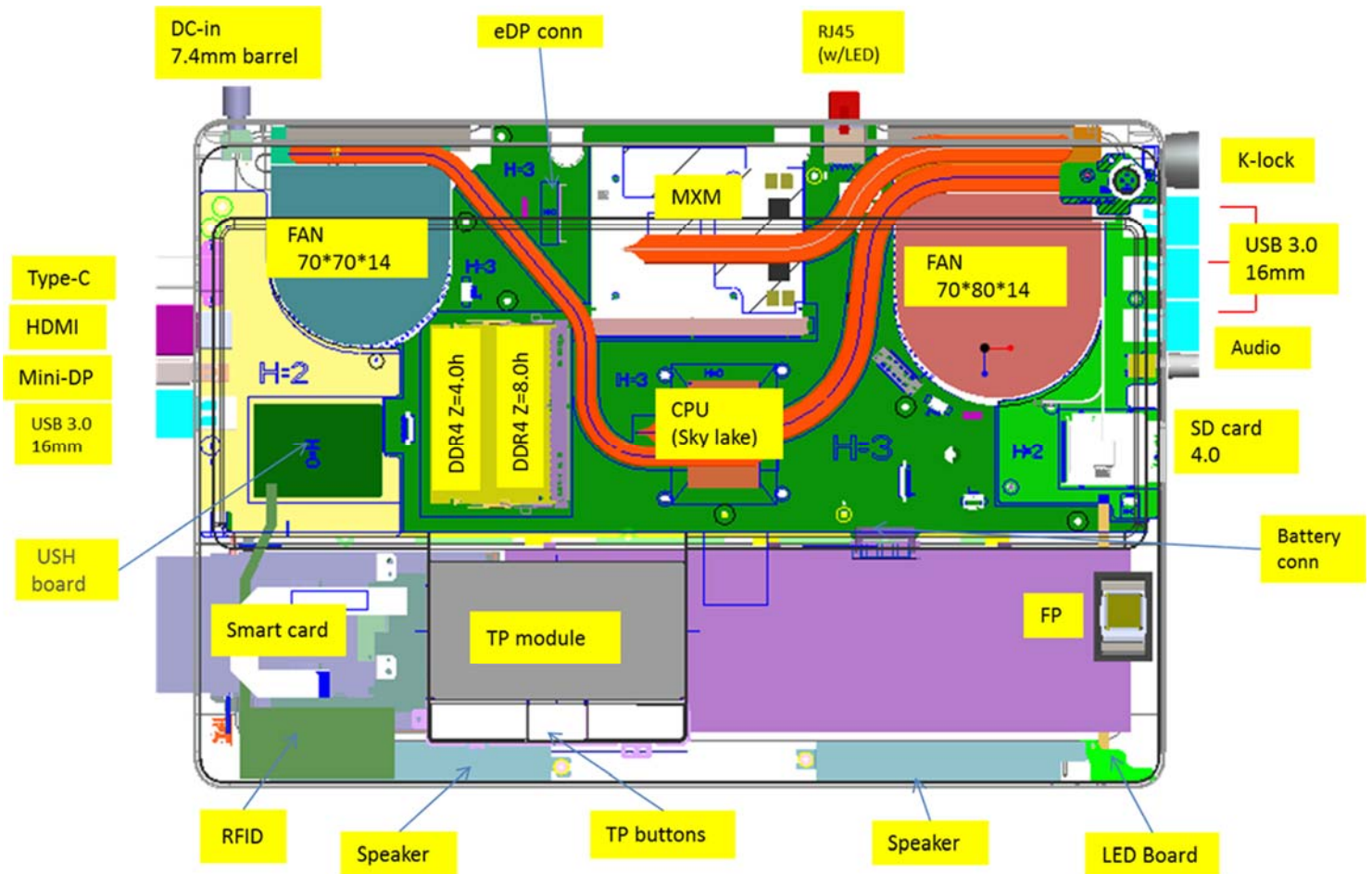
7510 TECHNICAL SPECIFICATION

Model Number	7510
Processor Options	Intel® Core™ i5 (non-vPro) / i7 (vPro) / Xeon (vPro) processors
Operating System Options	Genuine Windows® 7 Professional 64-bit Genuine Windows® 8.1 Professional 64-bit Genuine Windows® 10 Professional 64-bit Ubuntu 14.04
Memory ¹ Options	4 DIMM slots: up to 64GB 2133MHz DDR4 SDRAM; 4 DIMM slots: up to 64GB 2133MHz ECC-DDR4 SDRAM; 4 DIMM slots: up to 32GB 2667MHz DDR4 SDRAM;
Chipset	Mobile Intel® CM236 Chipset
Graphics ² Options	AMD FirePro W5170M w/2GB GDDR5 NVIDIA Quadro M1000M w/2GB GDDR5 NVIDIA Quadro M2000M w/4GB GDDR5
Display Options	15.6" FHD(1920x1080) Anti-Glare LED-backlit (45% color gamut) 15.6" UltraSharp™ FHD IPS (1920x1080) Wide View Anti-Glare LED-backlit with Premium Panel Guarantee (72% color gamut) 15.6" UltraSharp™ FHD IPS Touch (1920x1080) Wide View Anti-Glare LED-backlit with Premium Panel Guarantee (72% color gamut) 15.6" UltraSharp™ UHD IGZO (3840x2160) Wide View Anti-Glare LED-backlit with Premium Panel Guarantee (100% Adobe color gamut)
Storage Options	Mainstream Drives
	2.5" 7200RPM 500GB / 1TB SATA HDD
	2.5" 5400RPM 500GB SATA FIPS HDD
	2.5" 5400RPM 2TB SATA HDD
	2.5" 256GB / 360GB / 512GB / 1TB SATA SSD
	2.5" 512GB SED SATA SSD
	M.2 PCIe 256GB / 512GB / 1TB SSD
	M.2 SATA 512GB SED SSD
	Performance Drives
	2.5" 256GB / 512GB SATA SSD
	M.2 PCIe 256GB / 512GB SSD
	Optional RAID 0 or 1
Optical Drive Options	None
Multimedia	High Quality Speakers
	Headphone/Headset/Microphone combo jack
	Integrated, noise reducing array microphones
	Optional Integrated HD video webcam
Battery Options	6-cell (72Wh) Lithium Ion battery with ExpressCharge™
	6-cell (91Wh) Lithium Ion battery with ExpressCharge™
	6-cell (85Wh) 3 Year Warranty Lithium Ion battery

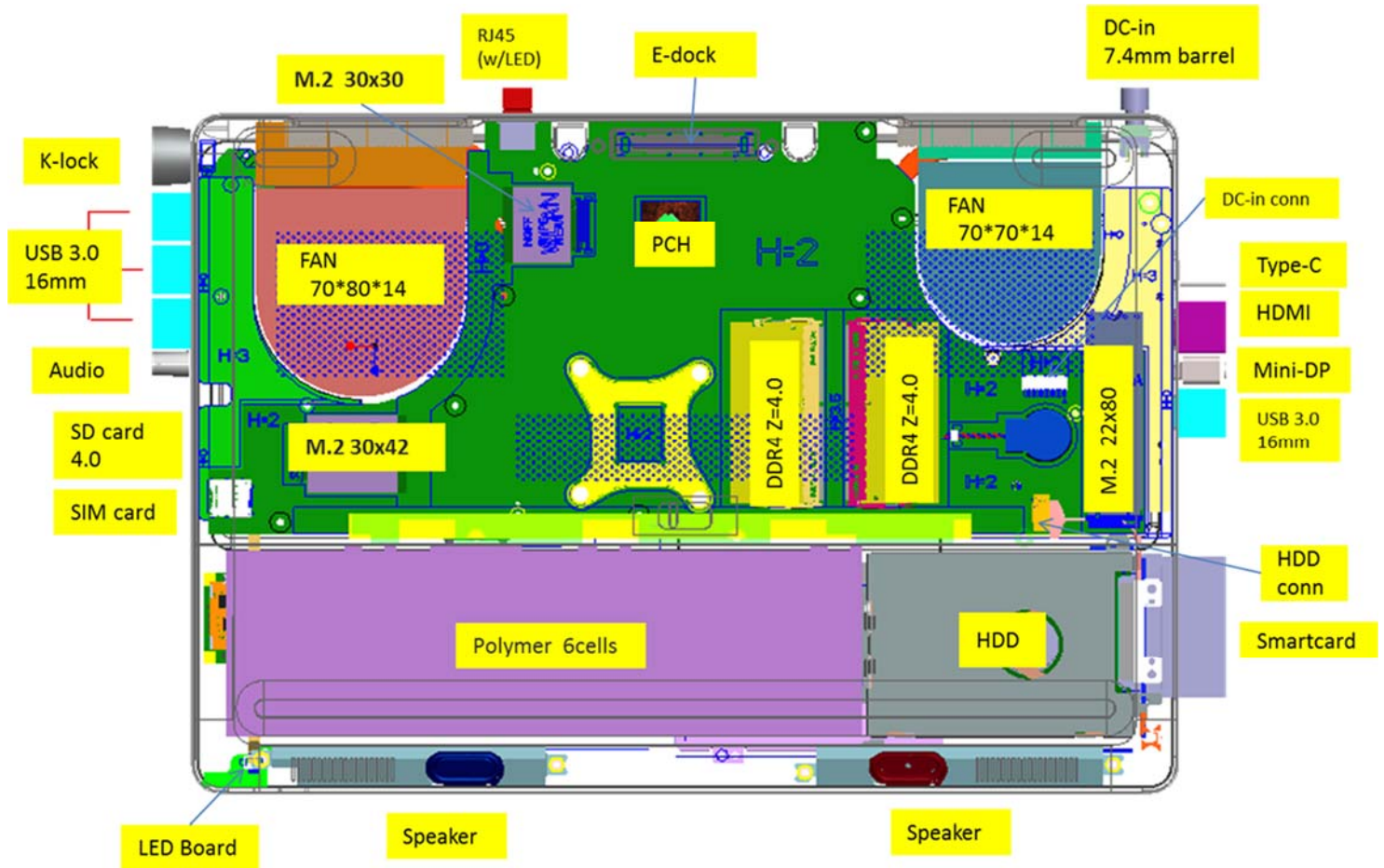
7510 TECHNICAL SPECIFICATION (CON.)

Power Options	180W AC Adapter
Connectivity	10/100/1000 Gigabit Ethernet
	Wireless LAN Options:
	Intel WiFi Link 8260 2x2 802.11ac+BT 4.1 (vPro)
	Dell DW1820 2x2 802.11ac+BT 4.1
Ports, Slots & Chassis	Mobile Broadband ² & GPS Options:
	DW5811e (Gobi 4G/LTE - FMC)
	Network connector (RJ-45)
	USB 3.0 * 4 w/ powershare
	Stereo headphone/headset/microphone jack
	Memory card reader
	Docking Connector, mDP 1.2, HDMI 1.4
Input	Optional SmartCard Reader, Contactless SmartCard Reader/Fingerprint Reader or FIPS Fingerprint Reader
	Thunderbolt 3 type C port
	Dual Pointing Keyboard: Standard or Backlit
Systems Management	Multi-touch Touchpad
	Intel® vPro™ Technology's advanced management features (optional, requires Intel WiFi® Link WLAN)

7510 SYSTEM LAYOUT (TOP)



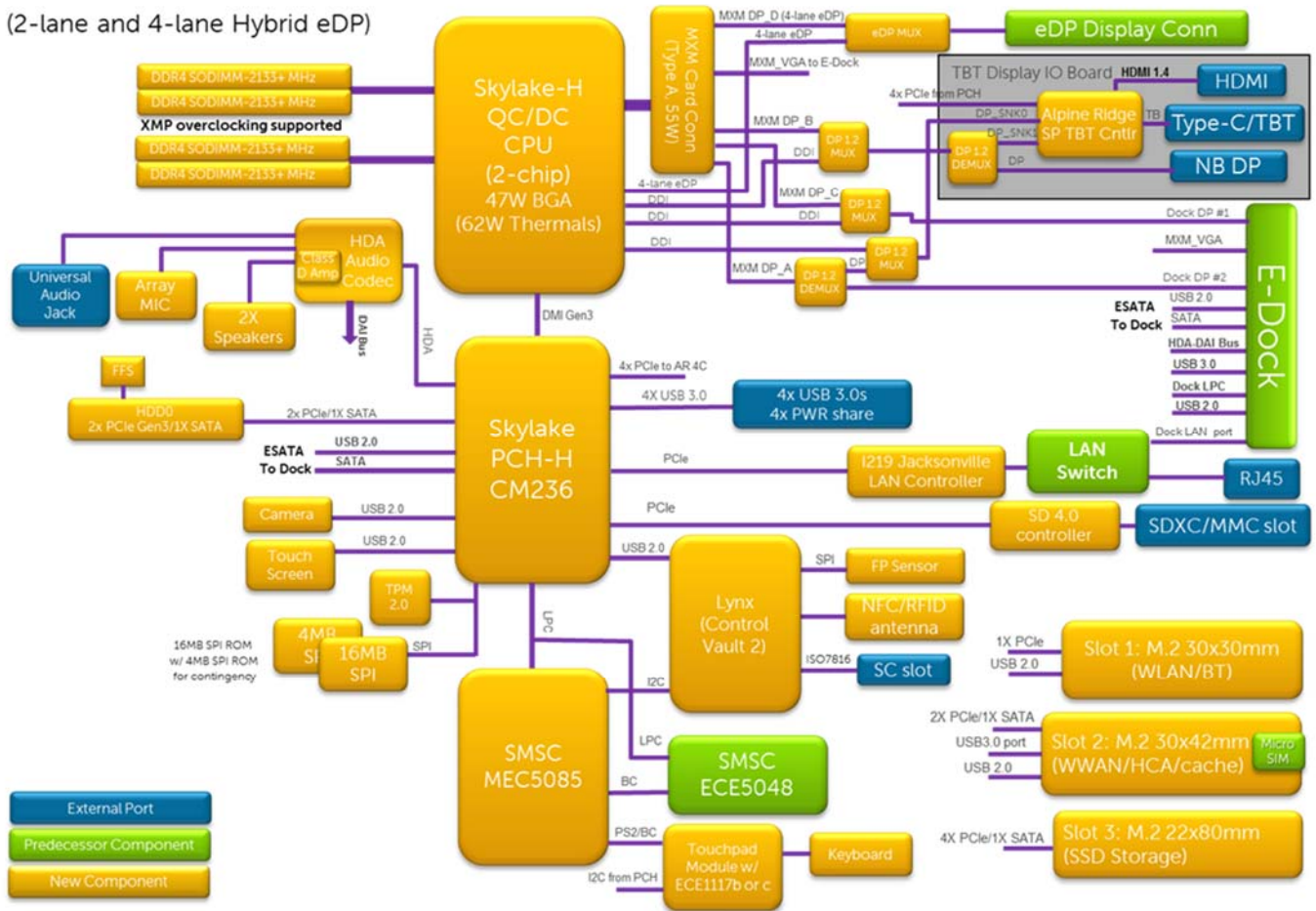
7510 SYSTEM LAYOUT (BOTTOM)



7510 Block diagram (w/TBT display IO Board)

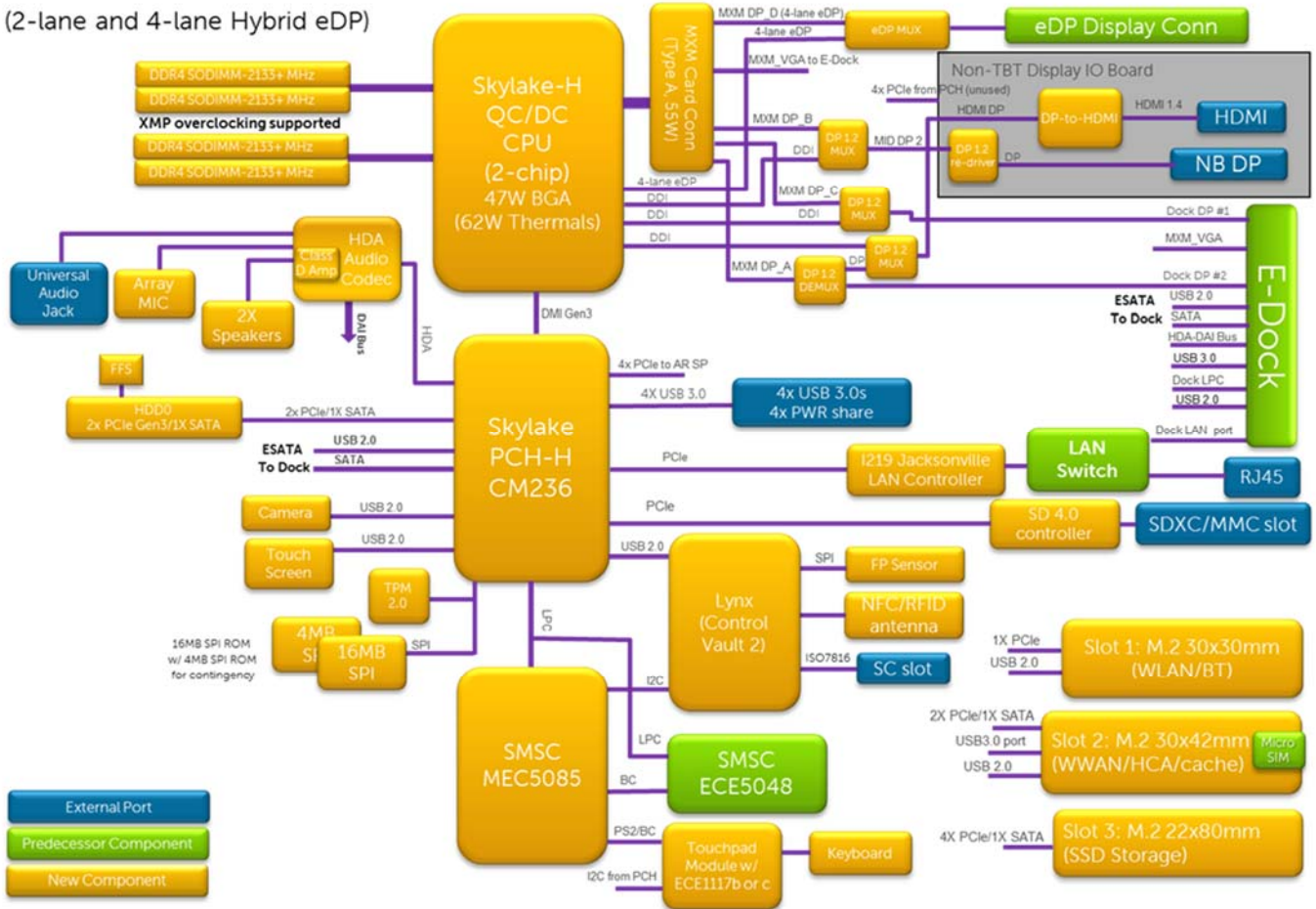
(2-lane and 4-lane Hybrid eDP)

(last updated 5/22/2015)

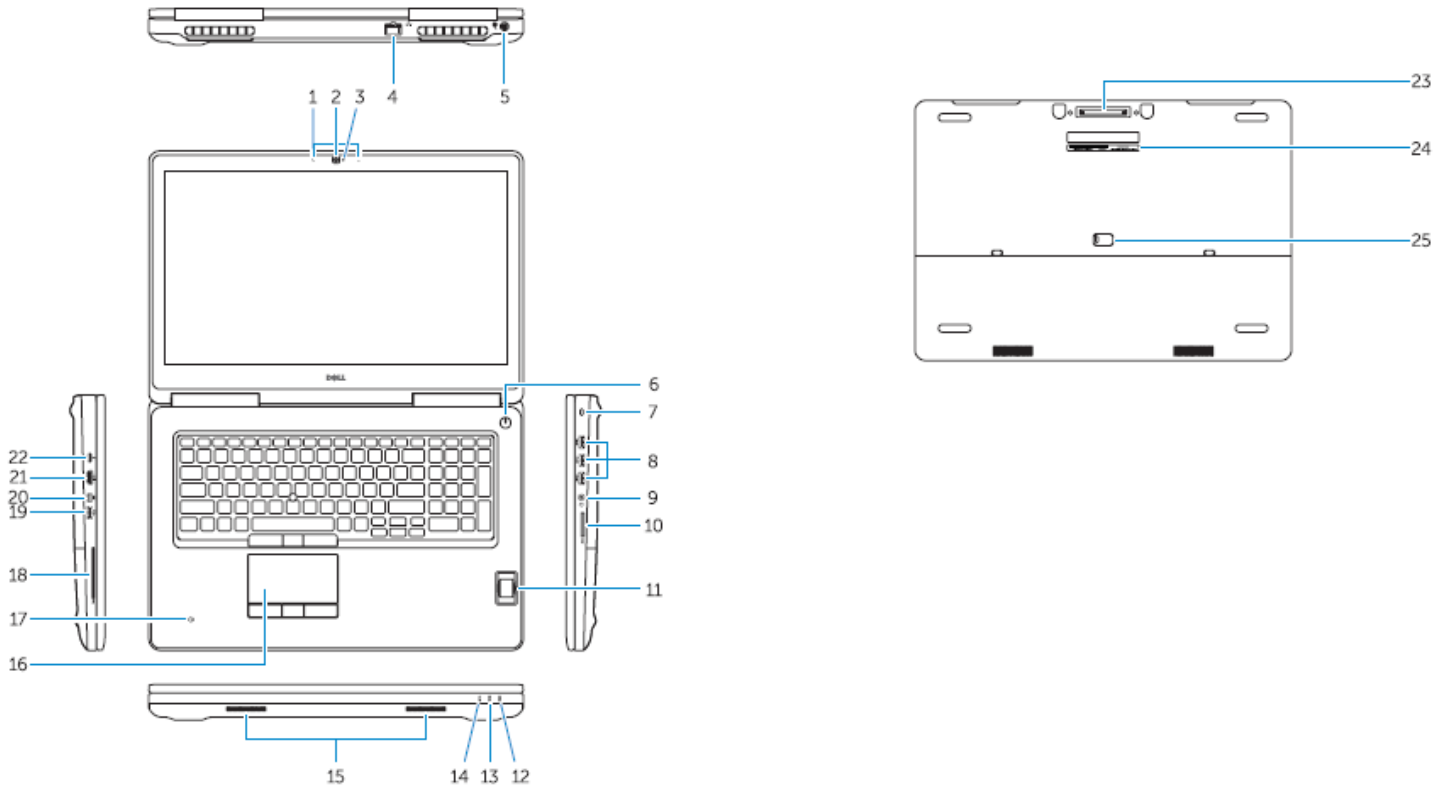


7510 Block diagram (w/ non-TBT display IO Board)
 (2-lane and 4-lane Hybrid eDP)

(last updated 5/22/2015)



7710 CHASSIS OVERVIEW



- 1. Microphone
- 2. Camera (optional)
- 3. Camera-status light (optional)
- 4. Network connector
- 5. Power connector
- 6. Power button (without LED)
- 7. Security-cable slot
- 8. USB 3.0 connector
- 9. Headset connector
- 10. Memory card reader
- 11. Fingerprint reader (optional)
- 12. Battery-status light
- 13. Hard-drive activity light
- 14. Power-status light
- 15. Speakers
- 16. Touchpad
- 17. Contactless smartcard reader (optional)
- 18. Smartcard reader (optional)
- 19. USB 3.0 connector
- 20. Mini DisplayPort connector
- 21. HDMI connector
- 22. USB-C connector (optional)
- 23. Docking connector
- 24. Service-tag label
- 25. Door and battery release latch

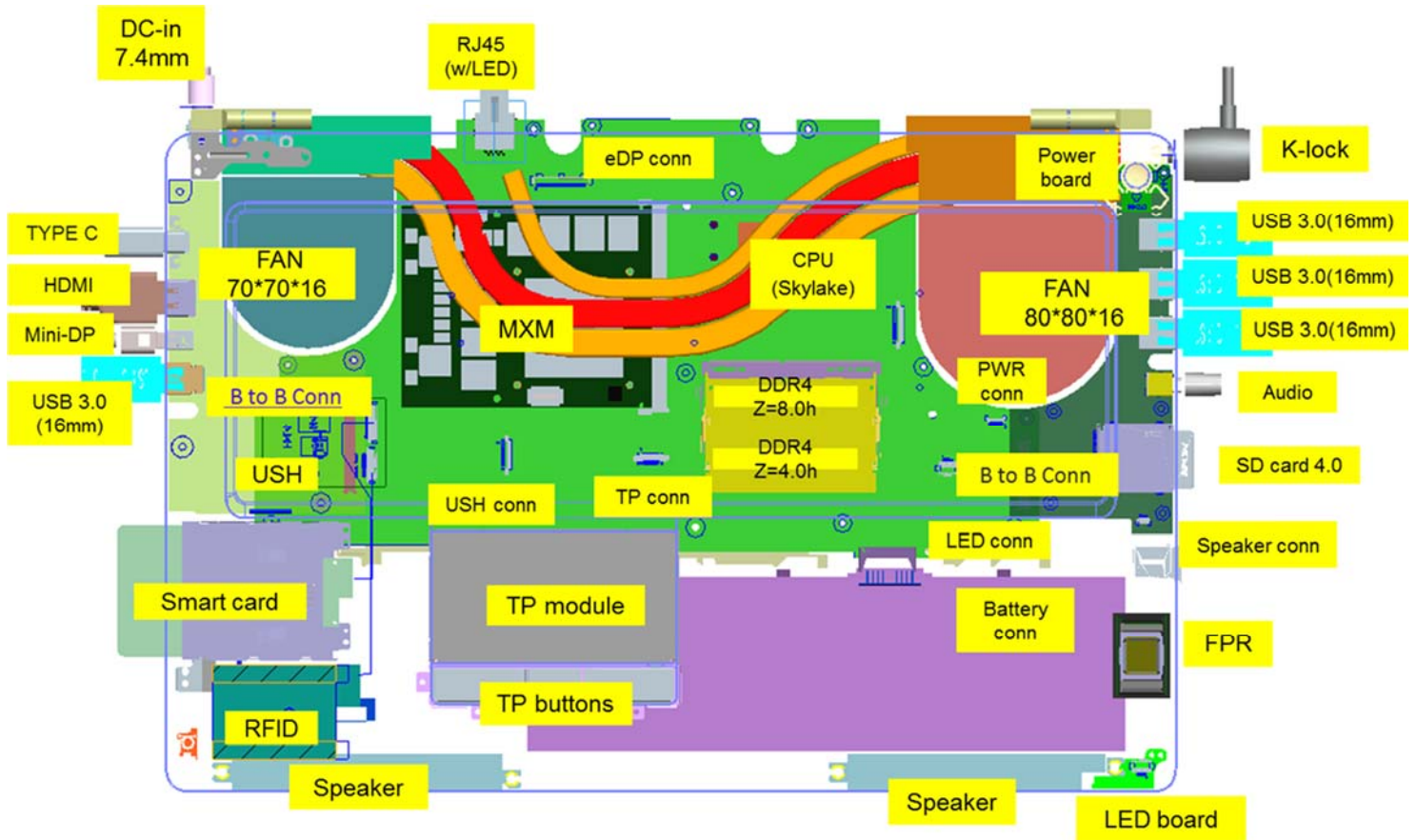
7710 TECHNICAL SPECIFICATION

Model Number	7710
Processor Options	Intel® Core™ i5 (non-vPro) / i7 (vPro) / Xeon (vPro) processors
Operating System Options	Genuine Windows® 7 Professional 64-bit
	Genuine Windows® 8.1 Professional 64-bit
	Genuine Windows® 10 Professional 64-bit
	Ubuntu 14.04
Memory ¹ Options	4 DIMM slots: up to 64GB 2133MHz DDR4 SDRAM;
	4 DIMM slots: up to 64GB 2133MHz ECC-DDR4 SDRAM;
	4 DIMM slots: up to 32GB 2667MHz DDR4 SDRAM;
Chipset	Mobile Intel® CM236 Chipset
Graphics ² Options	AMD FirePro W5170M w/2GB GDDR5
	AMD FirePro W7170M w/4GB GDDR5
	NVIDIA Quadro M3000M w/4GB GDDR5
	NVIDIA Quadro M4000M w/4GB GDDR5
	NVIDIA Quadro M5000M w/8GB GDDR5
Display Options	17.3" UltraSharp™ FHD IPS(1920x1080) Wide View Anti-Glare LED-backlit with Premium Panel Guarantee (72% color gamut)
	17.3" UltraSharp™ UHD IGZO(3840x2160) Wide View Anti-Glare LED-backlit with Premium Panel Guarantee (100% Adobe color gamut)
Storage Options	Mainstream Drives
	2.5" 7200RPM 500GB / 1TB SATA HDD
	2.5" 5400RPM 500GB SATA FIPS HDD
	2.5" 5400RPM 2TB SATA HDD
	2.5" 256GB / 360GB / 512GB / 1TB SATA SSD
	2.5" 512GB SED SATA SSD
	M.2 PCIe 256GB / 512GB / 1TB SSD
	M.2 SATA 512GB SED SSD
	Performance Drives
	2.5" 256GB / 512GB SATA SSD
	M.2 PCIe 256GB / 512GB SSD
	Optional RAID 0, 1, 5
	Optical Drive Options
Multimedia	High Quality Speakers
	Headphone/Headset/Microphone combo jack
	Integrated, noise reducing array microphones
	Optional Integrated HD video webcam
Battery Options	6-cell (72Wh) Lithium Ion battery with ExpressCharge™
	6-cell (91Wh) Lithium Ion battery with ExpressCharge™
	6-cell (85Wh) 3 Year Warranty Lithium Ion battery

7710 TECHNICAL SPECIFICATION (CON.)

Power Options	240W AC Adapter
Connectivity	10/100/1000 Gigabit Ethernet
	Wireless LAN Options:
	Intel WiFi Link 8260 2x2 802.11ac+BT 4.1 (vPro)
	Dell DW1820 2x2 802.11ac+BT 4.1
	Mobile Broadband ² & GPS Options: DW5811e (Gobi 4G/LTE - FMC)
Ports, Slots & Chassis	Network connector (RJ-45)
	USB 3.0 * 4 w/powershare
	Stereo headphone/headset/microphone jack
	Memory card reader
	Docking Connector, mDP 1.2, HDMI 1.4
	Optional SmartCard Reader, Contactless SmartCard Reader/Fingerprint Reader or FIPS Fingerprint Reader
	Thunderbolt 3 type C port
Input	Dual Pointing Keyboard: Standard or Backlit
	Multi-touch Touchpad
Systems Management	Intel® vPro™ Technology's advanced management features (optional, requires Intel WiFi® Link WLAN)

7710 SYSTEM LAYOUT (TOP)



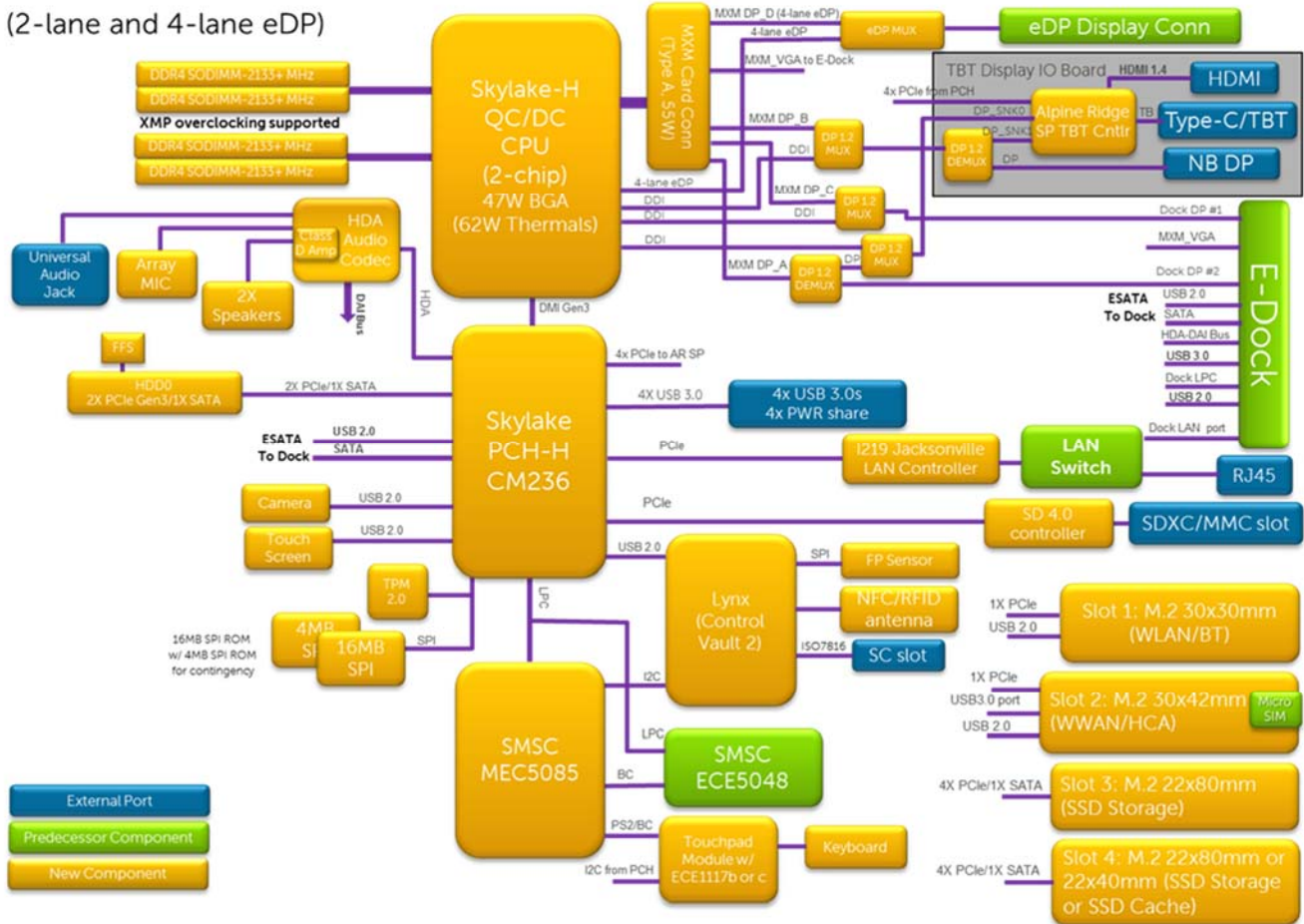
7710 SYSTEM LAYOUT (BOTTOM)



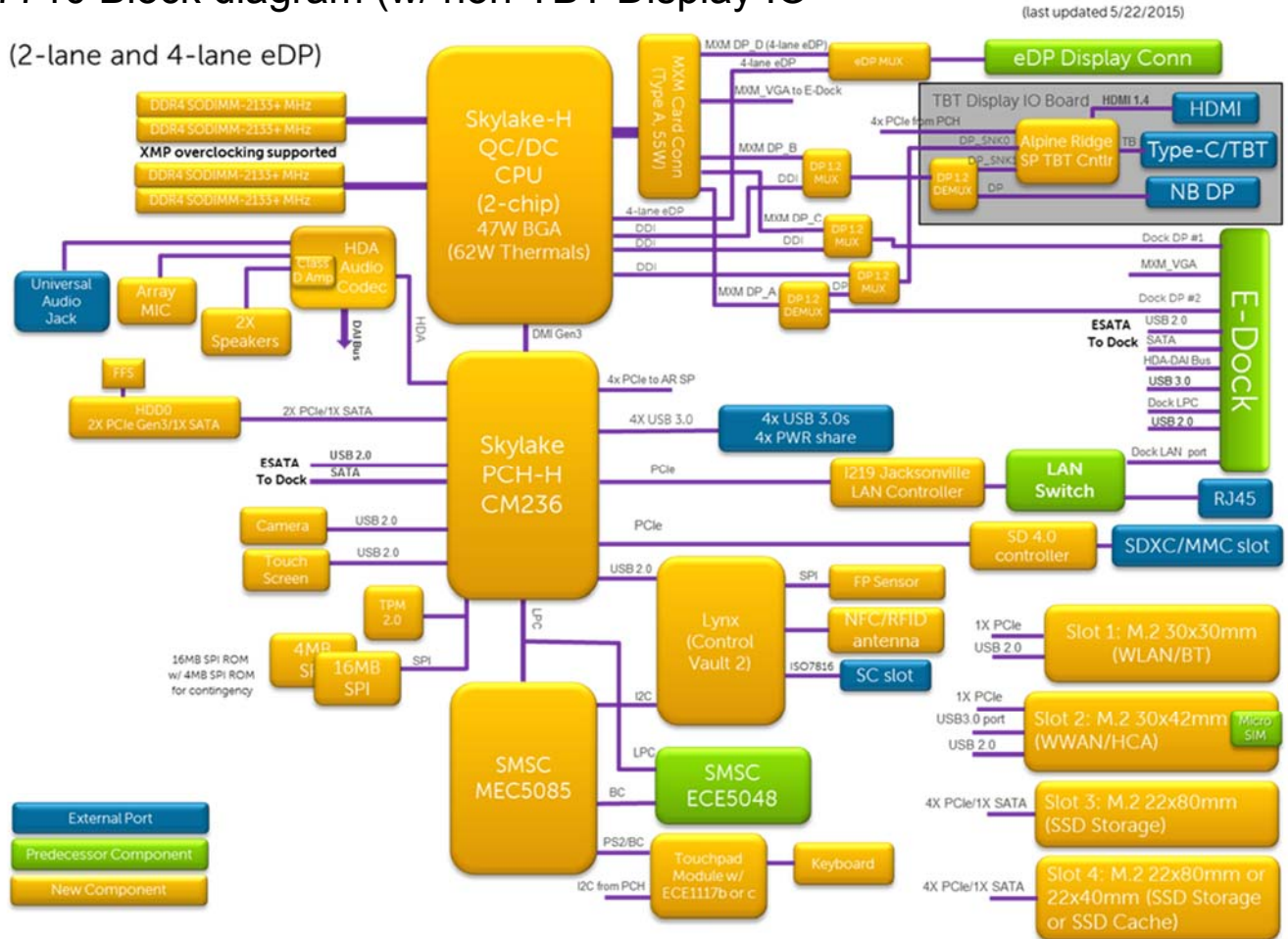
7710 Block diagram (w/ TBT Display IO Board)

(last updated 5/22/2015)

(2-lane and 4-lane eDP)



7710 Block diagram (w/ non-TBT Display IO)



SYSTEM CONFIGURATION OPTIONS

NOTE: Offerings may vary by country. .

OPERATING SYSTEMS

Microsoft® Windows 7® operating system	Factory Installed Microsoft® Windows 7® Professional (64 bit),
Microsoft® Windows 8.1® operating system	Factory Installed Microsoft® Windows® 8.1 Pro (64 bit),
Microsoft® Windows 10® operating system	Factory Installed Microsoft® Windows® 10 Pro (64 bit),
Ubuntu 14.04	Factory Installed

CHIPSET

Chipset	Intel CM236 Chipset
Non-volatile memory on chipset	
BIOS Configuration SPI (Serial Peripheral Interface)	64Mbit (8MB) & 32Mbit (4MB)
TPM 1.2/2.0 Security Device (Trusted Platform Module) ¹	18KB
Non-TPM	Available in select countries
NIC EEPROM	LOM configuration contained within SPI_FLASH – no dedicated LOM EEPROM

PROCESSORS

Intel Core Xeon E3-1575M v5 (Quad Core Xeon 3.00GHz, 3.90GHz Turbo, 8MB 45W, w/Iris Pro Graphics P580)

Intel Core Xeon E3-1545M v5 (Quad Core Xeon 2.90GHz, 3.80GHz Turbo, 8MB 45W, w/Iris Pro Graphics P580)

Intel Core Xeon E3-1535M v5 (Quad Core Xeon 2.90GHz, 3.80GHz Turbo, 8MB 45W, w/Intel HD Graphics P530)

Intel Core Xeon E3-1505M v5 (Quad Core Xeon 2.80GHz, 3.70GHz Turbo, 8MB 45W, w/Intel HD Graphics P530)

Intel Core i7-6920HQ (Quad Core 2.90GHz, 3.80GHz Turbo, 8MB 45W, w/Intel HD Graphics 530)

Intel Core i7-6820HQ (Quad Core 2.70GHz, 3.60GHz Turbo, 8MB 45W, w/Intel HD Graphics 530)

Intel Core i5-6300HQ (Quad Core 2.30GHz, 3.20GHz Turbo, 6MB 45W, w/Intel HD Graphics 530)

MEMORY

NOTE: The Dell Precision 7510 & 7710 have a two channel memory bus architecture. Dell recommends that both memory channels be populated with DIMMS for maximum memory performance. Dell Precision 7510 & 7710 workstations support Dell Reliable Memory Technology Pro which virtually eliminates memory errors.

Type:	DDR4 SDRAM RDIMM ECC
Max Frequency	2133 / 2667MHz
DIMM Slots	4
DIMM Capacities	4, 8, 16GB
Minimum Memory	8 GB (2 x 4GB)
Maximum System Memory	64GB

FACTORY INSTALLED MEMORY CONFIGURATIONS:

8.0GB, DDR4-2133MHz SDRAM, 2 DIMMS
16.0GB, DDR4-2133MHz SDRAM, 2 DIMMS
32.0GB, DDR4-2133MHz SDRAM, 2 DIMMS
32.0GB, DDR4-2133MHz SDRAM, 4 DIMMS
64.0GB, DDR4-2133MHz SDRAM, 4 DIMMS
8.0GB, ECC-DDR4-2133MHz SDRAM, 2 DIMMS
16.0GB, ECC-DDR4-2133MHz SDRAM, 2 DIMMS
32.0GB, ECC-DDR4-2133MHz SDRAM, 4 DIMMS
64.0GB, ECC-DDR4-2133MHz SDRAM, 4 DIMMS
8.0GB, DDR4-2667MHz SDRAM, 2 DIMMS
16.0GB, DDR4-2667MHz SDRAM, 2 DIMMS
32.0GB, DDR4-2667MHz SDRAM, 4 DIMMS

¹The total amount of available memory will be less than 4GB on systems running 32-bit operating systems. The amount less depends on the actual system configuration. To fully utilize 4GB or more of memory requires a 64-bit operating system.

SECURITY

Trusted Platform Module (TPM) 1.2 & 2.0	Integrated on system board
Smartcard	Optional
Dell Data Protection Encryption Accelerator Card	Optional

¹TPM is not available in all countries. Depending on your country regulations, no-TPM system boards may be available.

SECURITY SOFTWARE

Dell Data Protection Security Tools (DDP ST)	Standard
Dell Data Protection Encryption (DDPE)	Optional

MISC. SOFTWARE

Dell Precision Optimizer V3.0	Included at no charge with 7510 & 7710 Details at
Teradici PCoIP® Workstation Access Software	Optional

SERVICE AND SUPPORT

NOTE: For more details on Dell Service Plans please to go to: www.dell.com/service/service_plans

3 Year Warranty ¹ Next Business Day On-site ² (3-3-3)	Standard
ProSupport	Optional

¹ For a copy of our guarantees or limited warranties, please write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. For more information, visit www.dell.com/warranty.

² Service may be provided by third-party. Technician will be dispatched if necessary following phone-based troubleshooting. Subject to parts availability, geographical restrictions and terms of service contract. Service timing dependent upon time of day call placed to Dell. U.S. only.

DETAILED ENGINEERING SPECIFICATIONS

SYSTEM DIMENSIONS (PHYSICAL)

NOTE: System Weight and Shipping Weight is based on a typical configuration and may vary based on actual configuration. A typical configuration includes: one graphics card one hard drive, one optical drive.

	7510		7710
	Non-Touch	Touch	Non-Touch
Weight (pounds/kilograms)	6.18 Lbs	6.58 Lbs	7.58 Lbs
Dimensions: (HxWxD)			
Height (inches/centimeters)	27.7mm(Front) 33mm(Rear)	28.4mm(Front) 33.7mm(Rear)	28.7mm(Front) 35.3mm(Rear)
Width (inches/centimeters)	378mm	378mm	416.7mm
Depth (inches/centimeters)	261mm	261mm	281.2mm

7510:
 6-cell polymer battery pack (smallest)
 One M.2 22x80 SSD storage card (in M.2 Slot 3)
 One 4 GB SO-DIMM module
 WLAN card - YES
 Camera/Mic Module = Mic only
 Mobile Broadband = No
 Security SKU (CV2, Smartcard, Fingerprint Reader, RFID) = No

7710:
 6-cell polymer battery pack (smallest)
 One M.2 SSD storage card (in M.2 Slot 3)
 One 4 GB SO-DIMM module
 WLAN card - YES
 Camera/Mic Module = Mic only
 Mobile Broadband = No
 Security SKU (CV2, Smartcard, Fingerprint Reader, RFID) = No

Shipping Materials

Miramar 15:
 Weight: 4878 g / 10.75 lbs
 Min Config
 Box OD – 505.00 mm x 91.00 mm x 354.00 mm

Miramar 17:
 Weight: 6782 g / 14.95 lbs
 Min Config
 Box OD – 590.62 mm X 97.30 mm X 354.44 mm

SYSTEM LEVEL ENVIRONMENTAL AND OPERATING CONDITIONS

Temperature	
Operating	10° to 35° C (50° to 95° F)
Non-Operating (Storage)	-40° to 65° C (-40° to 149° F)
Relative Humidity	20% to 80% (non-condensing)
Maximum vibration	
Operating	5 to 350 Hz at 0.0002 G ² /Hz
Non-Operating	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 51 cm/sec [20 in/sec])
Non-Operating	105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 127 cm/sec [50 in/sec])
Maximum Altitude	
Operating	-15.2 to 3048 m (-50 to 10,000 ft)
Non-Operating	-15.2 to 10,668 m (-50 to 35,000 ft)

SMART CARD SUPPORTED

	ISO14443A	ISO14443B	ISO15693	Functionality
SeOS	X	X		A
PIV-II	X	X		B
DesFire	X			C
SmartMX	X			C
JCOP (Java Card)	X			C*
JTOP (Java Card)	X	X		C*
Passport cards/National ID cards	X	X		C
EMVCo cards (Paypass, PayWave, ExpressPay)	X	X		C
Mifare Classic	X			D
Mifare Plus (SL1)	X			D
Mifare Ultralight	X			E
Felica	X			E

Functionality:

A - HID Secure Application can be used for pre-boot authentication, HID Secure Application Area Read, and Read/Write of All Other Application Areas (post-boot), Anti-Collision to support multiple cards in the field.

B - CHUID (can be used for pre-boot authentication), ISO/IEC 14443 Part 4 communication via PC/SC 2.01 (post-boot), Anti-Collision to support multiple cards in the field.

C - UID Read (for pre-boot authentication), ISO/IEC 14443 Part 4 communication via PC/SC 2.01 (post-boot), Anti-Collision to support multiple cards in the field.

D - UID Read (pre-boot authentication and also for post-boot), Anti-Collision to support multiple cards in the field.

E - Configurable for UID Read (pre-boot authentication and also for post-boot), Anti-Collision to support multiple cards in the field.

* Java cards installed with Seos app will have functionality A

ADAPTER

	7510: 180W	7710: 240W
Input voltage	100 to 240 VAC	100 to 240 VAC
Input current (max)	2.34 A	3.5 A
Input frequency	50 to 60 Hz	50 to 60 Hz
Output current	9.23 A (continuous)	12.31A (continuous)
Rated output voltage	19.5 VDC	19.5 VDC
Weight (lbs)	1.28	1.88
Weight (kg)	0.58	0.85
Dimensions (inches)	1.18 x 3.0 x 6.1	1.0 x 3.94 x 7.87
Dimensions (mm)	30.0 x 76.2 x 155	25.4 x 100 x 200
Temperature range:	0° to 40°C	0° to 40°C
Operating	32° to 104°F	32° to 104°F
Storage	-40° to 70°C	-40° to 70°C
Storage	-40° to 158°F	-40° to 158°F

GRAPHICS-NV FOR 7510

Graphics Controller	NVIDIA Quadro M1000M	NVIDIA Quadro M2000M
Platform Availability		
Graphics Memory	2GB GDDR5	4GB GDDR5
Bus Type	PCIe x16 Gen3	PCIe x16 Gen3
Memory Interface	128-Bit	128-Bit
Clock Speeds	1080 MHz graphics core (min. at P0)	1080 MHz graphics core (min. at P0) 2500 MHz memory
Estimated Maximum Power	45W	55W
Display Support	VGA/LVDS/eDP/DVI/DisplayPort/HDMI	VGA/LVDS/eDP/DVI/DisplayPort/HDMI
Maximum Color Depth	Up to 10bit/color	Up to 10bit/color
Maximum Vertical Refresh Rate	It depends on the panel Up to 395Hz at 1920x1080 Up to 118Hz at 3840x2160	It depends on the panel Up to 395Hz at 1920x1080 Up to 118Hz at 3840x2160
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5	DirectX 12, OpenGL 4.5
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max Digital: 5820x2880 @60Hz (dual DP) Max Analog: 1920x1200@ 60Hz	Max Digital: 5820x2880 @60Hz (dual DP) Max Analog: 1920x1200@ 60Hz
Numbers of Displays Sup-	Up to four displays	Up to four displays

GRAPHICS-NV FOR 7710

Graphics Con-	NVIDIA Quadro M3000M	NVIDIA Quadro M4000M	NVIDIA Quadro M5000M
Platform Availa-			
Graphics	4GB GDDR5	4GB GDDR5	8GB GDDR5
Bus Type	PCIe x16 Gen3	PCIe x16 Gen3	PCIe x16 Gen3
Memory Inter-	256-Bit	256-Bit	256-Bit
Clock Speeds	1080 MHz graphics core (min. at P0) 2500 MHz memory	1080 MHz graphics core (min. at P0) 2500 MHz memory	1080 MHz graphics core (min. at P0) 2500 MHz memory
Estimated Maxi- mum Power Consumption	75W	100W	100W
Display Support	VGA/LVDS/eDP/DVI/DisplayPort/HDMI	VGA/LVDS/eDP/DVI/DisplayPort/HDMI	VGA/LVDS/eDP/DVI/DisplayPort/HDMI
Maximum Color	Up to 10bit/color	Up to 10bit/color	Up to 10bit/color
Maximum Verti- cal Refresh Rate	It depends on the panel Up to 395Hz at 1920x1080 Up to 118Hz at 3840x2160	It depends on the panel Up to 395Hz at 1920x1080 Up to 118Hz at 3840x2160	It depends on the panel Up to 395Hz at 1920x1080 Up to 118Hz at 3840x2160
Operating Sys- tems Graphics/ Video API Sup- port	DirectX 12, OpenGL 4.5	DirectX 12, OpenGL 4.5	DirectX 12, OpenGL 4.5
Supported Res- olutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max Digital: 5820x2880 @60Hz (dual DP) Max Analog: 1920x1200@ 60Hz	Max Digital: 5820x2880 @60Hz (dual DP) Max Analog: 1920x1200@ 60Hz	Max Digital: 5820x2880 @60Hz (dual DP) Max Analog: 1920x1200@ 60Hz
Numbers of Displays Sup- ports	Up to four displays	Up to four displays	Up to four displays

GRAPHICS-AMD FOR 7510

Graphics Controller	AMD® FirePro® W5170M
Platform Availability	N/A
Graphics Memory	2GB GDDR5
Bus Type	Internal PCIe Gen3, x16
Memory Interface	128-Bit
Clock Speeds	925MHz graphics core, 1125 MHz memory
Estimated Maximum Power Consumption	55W TGP (GPU + frame buffer)
Display Support	VGA/LVDS (or eDP for QHD+ panel)/DisplayPort/HDMI
Maximum Color Depth	Maximum 4:4:4 Color Depth:12 (bits per pixel)
Maximum Vertical Refresh Rate	Up to 85Hz depending on resolution
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.4
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max Digital: 4096 × 2160 @ 30 Hz Max Analog: 2048 × 1536 @ 85 Hz
Numbers of Displays Supports	Please refer to the “Dell’s design” section

GRAPHICS-AMD FOR 7710

Graphics Controller	AMD® FirePro® W5170M	AMD® FirePro® W7170M
Platform Availability	N/A	N/A
Graphics Memory	2GB GDDR5	4GB GDDR5
Bus Type	Internal PCIe Gen3, x16	Internal PCIe Gen3, x16
Memory Interface	128-Bit	256-Bit
Clock Speeds	925MHz graphics core, 1125 MHz memory	723 MHz graphics core, 1250 MHz memory
Estimated Maximum Power Consumption	55W TGP (GPU + frame buffer)	100W TGP (GPU + frame buffer)
Display Support	VGA/LVDS (or eDP for QHD+ panel)/ DisplayPort/HDMI	VGA/LVDS (or eDP for QHD+ panel)/ DisplayPort/HDMI
Maximum Color Depth	Maximum 4:4:4 Color Depth:12 (bits per pixel)	Maximum 4:4:4 Color Depth:12 (bits per pixel)
Maximum Vertical Refresh Rate	Up to 85Hz depending on resolution	Up to 85Hz depending on resolution
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.4	DirectX 11.2, OpenGL 4.4
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max Digital: 4096 × 2160 @ 30 Hz Max Analog: 2048 × 1536 @ 85 Hz	Max Digital: 4096 × 2160 @ 60 Hz Max Analog: 2048 × 1536 @ 85 Hz

PRECISION 7510 & 7710 GRAPHICS MODES

Default System BIOS setting is 'Enable Switchable Graphics'

Switchable Graphics is when the Precision system uses the Intel graphics on the CPU and the dedicated FirePro or Quadro GPU based on the workload to provide maximum performance and while maximizing battery life.

FirePro drivers with AMD Endoro or Quadro drivers with NVIDIA Optimus manage GPU performance based on active applications

Precision workstations can be set enable or disable switchable graphics in the system BIOS

In system BIOS check or uncheck "Enable Switchable Graphics" in the Video section.

When disabled, the FirePro or Quadro GPU is driving the video ports. This is useful when AC powered or to insure maximum graphics performance at all times.

PRECISION 7510 & 7710 GRAPHICS MODES

7510 & 7710 Monitor Support – undocked and Dell Docks Switchable Graphics Enabled

[Click for Additional Details](#)

Precision 7510 & 7710

Undocked	Docked (Simple E-Port)	Docked (E-Port Plus)
Maximum Displays = 3	Maximum Displays = 6	Maximum Displays =6
Two external monitors + LCD <ul style="list-style-type: none"> • LCD (FHD/UltraHD) • mDP (max. 3840x2160@60Hz) • HDMI 1.4 (max. 3840x2160@30Hz) • Type-C (max. 3840x2160@60Hz) Note: mDP is disabled when HDMI and Type-C are enabled	Three from system and three from dock ports: <ul style="list-style-type: none"> • DP • DVI • VGA 	Three from system and three from dock ports: <ul style="list-style-type: none"> • 1st DP or 1st DVI • 2nd DP or 2nd DVI • VGA
	Dell Dock	Dell Thunderbolt Dock
	Maximum Displays = 3	Maximum Displays = 3
Max resolutions for video ports unless noted: VGA max. 1920x1200@60Hz DVI max 1920x1200@60Hz DP max. 3840x2160@60Hz mDP max. 3840x2160@60Hz HDMI 1.4 (max. 3840x2160@60Hz) 60Hz supported with Universal cable Type-C (max. 3840x2160@60Hz)	Three from system and dock ports: <ul style="list-style-type: none"> • VGA (always driven) • mDP • HDMI 1.4 (max. 3840x2160@30Hz) 	Three from system and dock ports: <ul style="list-style-type: none"> • DP • Dock HDMI 3840x2160@30Hz • mDP • VGA • Type-C

7510 & 7710 Monitor Support – undocked and Dell Docks Switchable Graphics Disabled

[Click for Additional Details](#)

Precision 7510 & 7710

Undocked	Docked (Simple E-Port)	Docked (E-Port Plus)
Maximum Displays = 3	Maximum Displays = 6	Maximum f Displays =6
Two external monitors + LCD <ul style="list-style-type: none"> • LCD (FHD/UltraHD) • mDP (max. 3840x2160@60Hz) • HDMI 1.4 (max. 3840x2160@30Hz) • Type-C (max. 3840x2160@60Hz) Note: mDP is disabled when HDMI and Type-C are enabled	Six from system and dock ports: <ul style="list-style-type: none"> • DP • DVI • VGA 	Three from system and dock ports: <ul style="list-style-type: none"> • LCD (FHD/UltraHD) • Type-C • HDMI 1.4 OR mDP Three from E-dock ports enabled <ul style="list-style-type: none"> • 1st DP or 1st DVI • 2nd DP or 2nd DVI • Dock_VGA
	Dell Dock	Dell Thunderbolt Dock
	Maximum Displays = 6(AMD) /4(Nvidia)	Maximum Displays = 6(AMD) /4(Nvidia)
Max resolutions for video ports unless noted: VGA max. 1920x1200@60Hz DVI max 1920x1200@60Hz DP max. 3840x2160@60Hz mDP max. 3840x2160@60Hz HDMI 1.4 (max. 3840x2160@60Hz) 60Hz supported with Universal cable Type-C (max. 3840x2160@60Hz)	6 or 4 from system and dock ports: <ul style="list-style-type: none"> • VGA (always driven) • mDP • HDMI 1.4 (max. 3840x2160@30Hz) 	6 or 4 from system and dock ports: <ul style="list-style-type: none"> • DP & mDP • HDMI 1.4 • VGA (always driven) • Type-C

CAMERA

Webcam Features	
Camera Type	HD fixed focus
Sensor Type	CMOS sensor technology
Resolution: Motion Video	Up to 1280 x 720 (1MP)
Resolution: Still Image	Up to 1280 x 720 (1MP)
Imaging Rate	Up to 30 frames per second

HARD DRIVES¹

2.5" 256GB SATA SOLID STATE DRIVE (SSD)	
Capacity (bytes)	256Gb
Dimensions inches (W x D x H)	Approximately (2.75 x 3.94 x 0.268 inches)
Interface type and Maximum speed	Up to 6Gb/s (SATA 3.0)
MTBF	800K hours
Logical Blocks	500,118,192
Power Source	
Power Consumption (reference only)	Idle 0.5W,. Active 2.5W

2.5" 360GB SATA SOLID STATE DRIVE (SSD)	
Capacity (bytes)	360Gb
Dimensions inches (W x D x H)	Approximately (2.75 x 3.94 x 0.268 inches)
Interface type and Maximum speed	Up to 6Gb/s (SATA 3.0)
MTBF	800K hours
Logical Blocks	703,282,608
Power Source	
Power Consumption (reference only)	Idle 0.5W,. Active 2.5W

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

HARD DRIVES¹

2.5" 512GB SATA SOLID STATE DRIVE (SSD)	
Capacity (bytes)	512Gb
Dimensions inches (W x D x H)	Approximately (2.75 x 3.94 x 0.268 inches)
Interface type and Maximum speed	Up to 6Gb/s (SATA 3.0)
MTBF	800K hours
Logical Blocks	1,000,215,216
Power Source	
Power Consumption (reference only)	Idle 0.5W, Active 2.5W

2.5" 512GB SATA SOLID STATE DRIVE (SSD) - SED	
Capacity (bytes)	512Gb
Dimensions inches (W x D x H)	Approximately (2.75 x 3.94 x 0.268 inches)
Interface type and Maximum speed	Up to 6Gb/s (SATA 3.0)
MTBF	800K hours
Logical Blocks	1,000,215,216
Power Source	
Power Consumption (reference only)	Idle 0.5W, Active 2.5W

HARD DRIVES¹**2.5" 2TB SATA 5400 RPM HDD**

Capacity (bytes)	2TB
Dimensions inches (W x D x H)	100.35 +0.2/-0.25mm x 69.85 ± 0.25mm x 9.5 ±0.2mm
Interface type and Maximum speed	SATA 6.0Gbps
Internal buffer size	32MB
Rotational Speed	5400 rpm
Logical Blocks	3,907,029,168
Power Source	
Power Consumption (reference only)	Idle 0.7W, Active 3.10 W
Spin Up Current (reference only)	1000mA

2.5" 1TB SATA 7200 RPM HDD

Capacity (bytes)	1TB (1,000,204,886,016 bytes)
Dimensions inches (W x D x H)	69.85 x 100.2 x 9.5 (mm)
Interface type and Maximum speed	SATA (6Gbps)
Internal buffer size	32MB
Rotational Speed	7200
Logical Blocks	1,953,525,168
Power Source	
Power Consumption (reference only)	1.8 W (Ave Read / Write) Active Idle 1.0 W Low Power Idle 0.8 W
Spin Up Current (reference only)	1.1A

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

HARD DRIVES¹ (CONT.)

2.5" 500GB SATA 7200 RPM HDD	
Capacity (bytes)	500GB
Dimensions inches (W x D x H)	100.35 +0.2/-0.25mm x 69.85 ± 0.25mm x 6.8 ± 0.2mm
Interface type and Maximum speed	SATA 6.0Gbps
Internal buffer size	32MB
Rotational Speed	7200 rpm
Logical Blocks	976,773,168
Power Source	
Power Consumption (reference only)	Idle 0.7W, Active 3.10 W
Spin Up Current (reference only)	1000mA

2.5" 500GB SATA 7200 RPM sed fips HDD	
Capacity (bytes)	500GB
Dimensions inches (W x D x H)	100.35 +0.2/-0.25mm x 69.85 ± 0.25mm x 6.8 ± 0.2mm
Interface type and Maximum speed	SATA 6.0Gbps
Internal buffer size	32MB
Rotational Speed	7200 rpm
Logical Blocks	976,773,168
Power Source	
Power Consumption (reference only)	Idle 0.7W, Active 3.10 W
Spin Up Current (reference only)	1000mA

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

HARD DRIVES¹ (CONT.)

M.2 PCIE 256GB SOLID STATE DRIVE (SSD)	
Capacity (bytes)	256Gb
Dimensions inches (W x D x H)	22 x 80 x 2.38
Interface type and Maximum speed	PCIe x 4
MTBF	800K hours
Logical Blocks	500,118,192
Power Source	
Power Consumption (reference only)	TBA

M.2 PCIE 512GB SOLID STATE DRIVE (SSD)	
Capacity (bytes)	512Gb
Dimensions inches (W x D x H)	22 x 80 x 2.38
Interface type and Maximum speed	PCIe x 4
MTBF	800K hours
Logical Blocks	1,000,215,216
Power Source	
Power Consumption (reference only)	TBA

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

HARD DRIVES¹ (CONT.)

M.2 PCIE 1TB SOLID STATE DRIVE (SSD)	
Capacity (bytes)	1024Gb
Dimensions inches (W x D x H)	22 x 80 x 3.73
Interface type and Maximum speed	PCIe x 4
MTBF	800K hours
Logical Blocks	2,000,409,264
Power Source	
Power Consumption (reference only)	TBA

M.2 SATA 512GB SOLID STATE DRIVE (SSD) – OPAL2	
Capacity (bytes)	512
Dimensions inches (W x D x H)	22 x 80 x 2.38
Interface type and Maximum speed	PCIe x 4
MTBF	800K hours
Logical Blocks	1,000,215,216
Power Source	
Power Consumption (reference only)	Idle 0.5W, Active 2.5W

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

BATTERY

	6cell 72Whr	6cell 91Whr	6cell 3yr (LCL)
Battery Type	lithium ion	lithium ion	lithium ion
Dimension			
Length	243.89 mm (9.6")	243.89 mm (9.6")	243.89 mm (9.6")
Width	71.30 mm (2.81")	71.30 mm (2.81")	71.30 mm (2.81")
Height	18.45 mm (0.73")	18.45 mm (0.73")	18.45 mm (0.73")
Weight	400.00 g (0.88 lb)	410.00 g (0.9 lb)	410.00 g (0.9 lb)
Voltage	11.1VDC	11.4VDC	11.4VDC
Typical Amp-hour capacity	6.49Ah	7.98Ah	7.71Ah
Typical Watt-hour capacity	72Whr	91Whr	88Whr
Temperature			
Operating	Charge: 0 °C to 50 °C, 32 °F to 158 °F	Charge: 0 °C to 50 °C, 32 °F to 158 °F	Charge: 0 °C to 50 °C, 32 °F to 158 °F
	Discharge: 0 °C to 70 ° C, 32 °F to 122 °F	Discharge: 0 °C to 70 ° C, 32 °F to 122 °F	Discharge: 0 °C to 70 ° C, 32 °F to 122 °F
Non-Operating	-20 °C to 65 °C 4 °F to 149 °F	-20 °C to 65 °C 4 °F to 149 °F	-20 °C to 65 °C 4 °F to 149 °F
Charging time	0~15degC: 4 hour 16~45degC: 2 hours 46~60degC: 3 hours	0~15degC: 4 hour 16~45degC: 2 hours 46~60degC: 3 hours	0~15degC: 4 hour 16~60degC: 3 hours
ExpressCharge Capable	x	x	
BATTMAN Capable	x	x	
3YR LLC Battery, non-EC			x

¹ For hard drives, GB means 1 billion bytes ; actual capacity varies with preloaded material and operating environment and will be less.

LCD—15"

7510	15.6" FHD Wide View Anti-Glare LED 45% CG	15.6" FHD Wide View Anti-Glare LED 72% CG	15.6" UHD Wide View Anti-Glare LED	15.6" FHD Wide View Anti-Glare LED Touch
Type	FHD Wide View Anti-Glare	FHD Wide View Anti-Glare	UHD Wide View Anti-Glare	FHD Wide View Anti-Glare Touch
Luminance/Brightness (typical)	220 nits	300 nits	350 nits	300 nits
Dimensions (Active Area)				
Height	193.59mm	193.59mm	194.4mm	193.59mm
Width	344.16mm	344.16mm	345.6mm	344.16mm
Diagonal	15.6	15.6	15.6	15.6
Native Resolution	1920 x 1080	1920 x 1080	3840x2160	1920 x 1080
Megapixels	2.07	2.07	8.29	2.07
Pixels per Inch (PPI)	141	141	282	141
Contrast Ratio (min)	400:1	500:1	700:1	500:1
Refresh Rate	60 Hz	60 Hz	60 Hz	60 Hz
Horizontal Viewing Angle	+/- 80 degrees	+/- 80 degrees	+/- 80 degrees	+/- 80 degrees
Vertical Viewing Angle	+/- 80 degrees	+/- 80 degrees	+/- 80 degrees	+/- 80 degrees
Pixel Pitch	0.179 mm	0.179 mm	0.0897 mm	0.179 mm
Power Consumption (max)	4.2W	6.2W	7.01W	6.2W

LCD—17"

7710	17.3" FHD Anti-Glare LED	17.3" UHD Anti-Glare
Type	FHD Wide View Anti-Glare	UHD Wide View Anti-Glare
Luminance/Brightness (typical)	300 nits	400 nits
Dimensions (Active Area)		
Width	381.89 mm	382.12 mm
Height	214.81 mm	214.94 mm
Diagonal	17.3	17.3
Native Resolution	1920x1080	3840x2160
Megapixels	2.07	8.29
Pixels per Inch (PPI)	128	255
Contrast Ratio (min)	500:1	800:1
Response Time (maximum)	30	30
Refresh Rate	60 Hz	60 Hz
Horizontal Viewing Angle	+/- 80 degrees	+/- 80 degrees
Vertical Viewing Angle	+/- 80 degrees	+/- 80 degrees
Pixel Pitch	0.199 mm	0.0995 mm
Power Consumption (max)	8W	14W

KEYBOARD

Keyboard Specs	
Number of keys	103 (U.S. and Canada) 104 (Europe) 106 (Brazil) 107 (Japan)
Layout	QWERTY/AZERTY/Kanji
Size	full sized (19-mm key pitch)
Backlit keyboard option	Easy enable/disable via hotkey <Fn+F10 key> 3 variable brightness levels

TOUCH PAD

X/Y position resolution	X: 41.27+-4.13 counts/mm Y: 38.75+-3.88 counts/mm 1048/984 cpi
Size	Sensor-active area: Width: 99.5mm (3.92") Height: 53mm (2.09")
Multi-Touch	Configurable Single Finger and Multi-Finger gestures

Supported Gestures	Windows 7	Windows 8.1
Circular Scrolling	Not Supported	Not Supported
Drag Lock	Supported (disabled by default)	Supported (disabled by default)
Edge Swipe	Not supported	Supported
Horizontal / Vertical Scroll Zones	Not supported	Not supported
Zoom Zones	Not supported	Not supported
Zig Zag	Supported (disabled by default)	Supported (disabled by default)
2-finger Pan / Scroll	Supported	Supported
2-finger Pinch Zoom	Supported (disabled by default)	Supported
2-finger Rotate	Supported (disabled by default)	Supported (disabled by default)
2-finger Tap	Not supported	Supported
3-finger Flick Right/Left/Up/Down	Supported (disabled by default)	Supported (disabled by default)

MEDIA CARD READER (MCR)

NOTE: Dell 19 in 1 Media Card Reader (MCR) is supported via an optional bracket. MCR is not available when a second optical drive is installed.

19 IN 1 MEDIA CARD READER	
External Dimensions inches/(centimeters) (With Bezel – W x H)	3.99/(10.13cm)/1.0/(2.54cm)
Weight (max) pounds/kilograms	~155g
Interface type and speed	USB 2.0, 480Mb/s
Media Supported (maximum capacity supported will vary by Flash Media Types)	
Media Supported	CF I CF II Micro Drive (MD) Secure Digital (SD) SDHC Mini Secure Digital (mini-SD) Micro Secure Digital (Micro-SD)(with adapter) Multi Media Card (MMC) RS Multi Media Card (RS-MMC) Multi Media Card plus (MMC plus) RS Multi Media Card plus (RS-MMC plus) Multi Media Card Micro(MMC Micro) (with adapter) Memory Stick (MS) Memory Stick Pro(MS Pro) Memory Stick Pro Duo (MS Pro Duo) Memory Stick Duo (MS-Duo) Memory Stick Micro(MS Micro)(M2) (with adapter) Smart Media (SM) xD
Support Specification Versions:	Compact Flash type I/II Version 4.0 Smart Media (SM) Specification 2003 Multi Media Card (MMC) Specification 4.2 Secure Digital (SD) 2.0 Memory Stick Pro (MS-PRO) Specification 1.02 Memory Stick (MS) Specification 1.43 xD Specification 1.2
Power Source	
Max Power Requirements	12V, 5V
Supply Voltage Range	4.75V ~ 5.25V
Power Consumption:	Standby less than 0.5mA @ 5.0VDC

BIOS DEFAULTS

System Configuration	Integrated NIC:	Enabled
	Serial Port:	COM1
	SATA Operation:	RAID On
	Drives	(All enabled by default), only 17" with SATA-4
	SMART Reporting:	Disabled
	USB Configuration::	Enable Boot Support/Front USB Ports/Rear USB Ports/USB3 Ports
	Audio:	Enabled
	Memory Map IO above 4GB	Disabled (Auto)
	Thunderbolt	Disabled
	Miscellaneous Devices	PCI Slot Enabled
	PCI MMIO Space Size	Small
	HDD Fans:	(depends on system configuration)
Video	Primary Video Slot	Auto
Performance	Multiple Core Support:	All (depends on system configuration)
	Intel \times SpeedStep™:	Enabled
	C States Control:	Enabled
	Limit CPUID	Enabled
	Intel TurboBoost	Enabled
	Non-Uniform Memory Access:	Enabled
	HyperThread control:	Enabled
	Cache Prefetch:	Enable Hardware Prefetch and Adjacent Cache Line Prefetch
	RMT:	Enabled
Virtualization Support	Virtualization:	Enabled
	VT for Direct I/O:	Enabled
	Trusted Execution	Disabled
Security	Strong Password	Enabled
	Password Configuration	Min=4, Max=32
	Password Bypass	Disabled
	Password Change	Allow Non-Admin Password Changes
	TPM Security	Disabled → Enable
	Computrace	Deactivate
	CPU XD Support	Enable CPU XD Support
	OROM Keyboard Access	Enable
	Admin Setup Lockout	Enable

BIOS DEFAULTS (CONT.)

Secure Boot	Secure Boot Enable	Disabled
	Expert Key Management	Disabled
Power Management	AC Recovery:	Power Off
	Auto On Time:	Disabled
	Deep Sleep Control:	Disabled
	Fan Speed Control:	Auto
	USB Wake Support	Disabled
	Block Sleep	Disabled
	Wake on LAN:	Disabled
Maintenance	Service Tag:	Set by the factory
	Asset Tag:	Optional User Entry
	SERR Message:	Enabled
System Logs	System Logs	List
Engineering Configurations	ASPM	Auto
	PCI-e Link Speed	Auto (Gen3)

HOT KEY DEFINATION

Keyboard Shortcuts	
Fn+ESC - Fn Lock	Allows the user to toggle between "locked" and "unlocked" Fn keys.
Fn+F1 - Audio Volume Mute	Temporarily mutes/unmutes the audio. The audio level before muting is returned after unmuting.
Fn+F2 – Audio Volume Down/ Decrease	Decreases the audio volume until minimum/off is reached.
Fn+F3 – Audio Volume Up/ Increase	Increases the audio volume until maximum is reached.
Fn+F4 – Microphone Mute	Silences the on-board microphone so it cannot record audio. There is an LED on the F4 function key that notifies the user of the state of this feature: - LED off = microphone capable of recording audio - LED on = microphone muted and unable to record audio
Fn+F5 – Num Lock	Used as Num Lock key.
Fn+F6—Scroll lock	Used as Scroll Lock key.
Fn+F7—Quiet Mode	Will toggle the applicable Quiet Mode: "Stealth Mode" for rugged systems and "Unobtrusive Mode" for non-rugged systems. See: §Dell "Quiet" Modes
Fn+F8 – LCD and Projector display	Determines video output to LCD and external Video device(s) when attached and display(s) present.
Fn+F9 – Search	Mimics the Windows key + F keystroke to open Windows' Search dialog.
Fn+F10 – KB Illumination/ Backlight	Determines the Keyboard Illumination/Backlight brightness level. The hot key cycles through the following brightness states when pressed: Disabled, Dim, Bright. See the Keyboard Illumination/Backlight section for more details.
Fn+F11 – Brightness Decrease	Decreases the stepping of LCD brightness for each press until minimum is reached. See the LCD Brightness section for more details.
Fn+F12 – Brightness Increase	Increases the stepping of LCD brightness for each press until maximum is reached. See the LCD Brightness section for more details.
Fn+PrintScreen – Radio On/Off Toggle	Toggles all the radios on and off. E.g.: WLAN, WWAN, Bluetooth
Fn+Insert – Sleep	Puts the system into the ACPI S3 State - does not wake the system.
Fn+RightCtrl – Context Menu	Used as Context Menu key. (a.k.a. Right-Click menu)
Fn+Left Cursor—Home	Used as Home key.
Fn+Right Cursor – End	Used as End key.
Fn+B – Pause/Break	Used as Pause/Break key. Specifically, Fn+B = Pause and Fn+Ctrl+B = Break.
Fn+(embedded keypad)	Used for converting the keyboard keys into a replicated number pad starting from keys 7, 8, & 9 down to ??key (see keyboard for reference).

Communications—Dell Wireless™ 5811E Gobi™ LTE Mobile Broadband Card for AT&T, Verizon, Sprint Wireless (US, Canada, Generic)

Dell Wireless™ 5811E Gobi™ LTE Mobile Broadband Card for AT&T, Verizon, Sprint Wireless (US, Canada, Generic)				
Carrier	Verizon	AT&T	Sprint	Generic
Network	LTE CAT6	LTE CAT6	LTE CAT6	LTE CAT6
Speed (Downlink)	< 300 Mbps	< 300 Mbps	< 300 Mbps	< 300 Mbps
Speed (Uplink)	< 50 Mbps	< 50 Mbps	< 50 Mbps	< 50 Mbps
Fallback Network	NA	HSPA+	NA	HSPA+
Fallback Speed (Downlink)	NA	HSPA+ 42 Mbps	NA	HSPA+ 42 Mbps
Frequency Bands	Band 4, 13 LTE	Band 13 LTE Band 2, 4, 5, 17 and 7	Band 25, 26, 41 LTE	Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 20, 25, 26, 29, 30, 41 LTE
SIM	Yes	Yes	Yes	Yes
LTE/WWAN Antenna	Main (Tx/Rx) + Aux (Rx/GNSS)	Main (Tx/Rx) + Aux (Rx/GNSS)	Main (Tx/Rx) + Aux (Rx/GNSS)	Main (Tx/Rx) + Aux (Rx/GNSS)
Operating System Support	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits
GNSS	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)
Host Interface	USB 3.0	USB 3.0	USB 3.0	USB 3.0

Communications—Dell Wireless™ 5811E Gobi™ LTE Mobile Broadband Card for AT&T, Verizon, Sprint Wireless (US, Canada, Generic) (CONT.)

Dell Wireless™ 5811E Gobi™ LTE Mobile Broadband Card for AT&T, Verizon, Sprint Wireless (US, Canada, Generic)		
Carrier	Rogers	Telus
Network	LTE CAT6	LTE CAT6
Speed (Downlink)	< 300 Mbps	< 300 Mbps
Speed (Uplink)	< 50 Mbps	< 50 Mbps
Fallback Network	HSPA+	HSPA+
Fallback Speed (Downlink)	HSPA+ 42 Mbps	HSPA+ 42 Mbps
Frequency Bands	Band 13 LTE Band 2, 4, 5, 17 and 7	Band 13 LTE Band 2, 4, 5, 17 and 7
SIM	Yes	Yes
LTE/WWAN Antenna	Main (Tx/Rx) + Aux (Rx/GNSS)	Main (Tx/Rx) + Aux (Rx/GNSS)
Operating System Support	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits
GNSS	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)
Host Interface	USB 3.0	USB 3.0

Communications—Dell Wireless™ 5811E Gobi™ for China and Indonesia

Dell Wireless™ 5811E Gobi™ for China and Indonesia		
Carrier	Generic	China / Indonesia
Network	HSPA+	HSPA+
Speed (Downlink)	< 100 Mbps	< 100 Mbps
Speed (Uplink)	< 50 Mbps	< 50 Mbps
Fallback Network	HSPA+	HSPA+
Fallback Speed (Downlink)	HSPA+ 42 Mbps	HSPA+ 42 Mbps
Frequency Bands	Band 1, 2, 3, 4, 5, 8, HSPA+	Band 1, 2, 3, 4, 5, 8, HSPA+
SIM	Yes	Yes
LTE/WWAN Antenna	Main (Tx/Rx) + Aux (Rx/GNSS)	Main (Tx/Rx) + Aux (Rx/GNSS)
Operating System Support	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits	Windows 8.1, 32/64 bits Windows 7, 32/64 bits Windows 10, 32/64 bits
GNSS	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)	Supports both autonomous GNSS (GPS + GLONASS) and assisted GNSS (A-GNSS)
Host Interface	USB 3.0	USB 3.0

Communications—Dell Wireless™ 1820 802.11AC Dual Band High Speed Wi-Fi + BT 4.1LE M.2 Card

Host interface	M.2 2230 form factor (WiFi – PCIe, Bluetooth – USB)
Network standard	802.11a, 802.11b, 802.11g, 802.11n and 802.11ac
Wi-Fi Alliance Certifications	802.11a, 802.11b, 802.11g, WPA, WPA2, WMM
Operating Frequency Bands	2.4 GHz (802.11b/g/n) and 5 GHz (802.11a/n/ac)
Dual Diversity Antenna Switching	Dual diversity antenna switching for systems designed with main and auxiliary antennas 2x2 MIMO operation when in 802.11n mode with 2x2 or greater Access Point
Data Rate	802.11ac – Up to 867 Mbps; 802.11n - Up to 450 Mbps; 802.11a/g - Up to 54 Mbps 802.11b - Up to 11 Mbps
Security Authentication EAP Methods	Open, Shared, WPA, WPA-PSK, WPA2, WPA2-PSK EAP-FAST, EAP-TLS, EAP-TTLS (MSCHAPv2), PEAPv0(EAP-MS-CHAPv2), PEAPv1(EAP-GTC)
Client Utility	Wireless profile and security management, site monitor, link status, adapter configuration and diagnostics for Win7
Software Support	Microsoft® WHQL certified for Windows® 7/8.1 and Windows® 10; Linux
Radio On/Off	Hardware and software on/off disables transmit and receive to comply with aviation in-flight restrictions
LED output	Wireless enable.
Roaming	Seamless roaming between 802.11a, 802.11b, 802.11b/g, 802.11n and 802.11ac access points
Wake On Wireless	Supported when using Magic Packet over the Air
Miracast (WiFi Display)	Supports WFA Miracast (WiFi Display) on Win8.1/10
Country Restrictions	DW1820A US sku for US/Canada DW1820A WW sku for rest of world DW1820A cannot be sold into Indonesia and Tunisia
Wireless PAN Standard	V4.1 LE
Bluetooth Data rates	Up to 3Mbps
Bluetooth Operating Frequency Bands	2.4GHz
Bluetooth Range	Up to 7m
Bluetooth Profiles Supported	Includes Streaming Stereo Quality Audio (A2DP), File Transfer (FTP/OBEX), Dial-up Networking (DUN), Mice/ Keyboards (HID), Headset (HSP), AVRCP 1.3, Wideband Audio Headset support
Bluetooth Data Encryption	128-bit encryption
Bluetooth Output Power	0 ≤ Output Power ≤ +10 ; Class I Device
Bluetooth Receive Sensitivity	BER < 0.1% (Tx: -70dBm)
Temperature	operating temperature 0° to +75° C storage temperature of -45° to +85° C
Humidity	Up to 90%

Communications—Intel® Dual Band Wireless-AC 8260 802.11AC Wi-Fi + BT 4.1 LE Wireless Card

Host interface	M.2 2230 form factor (WiFi – PCIe, Bluetooth – USB)
Network standard	IEEE 802.11a/b/g/n/ac
Wi-Fi Alliance Certifications	802.11ac, 802.11n, 802.11w, WPA, WPS, WMM, WFD, Wi-Fi Direct
Operating Frequency Bands	2.4 GHz and 5 GHz
Dual Stream N	Support for two transmit and receive antennas enable better wireless at the same distance when compared to older 802.11a/b/g solutions.
Data Rate	Up to 867 Mbps
Power Consumption	Optimized power modes (sleep states) reduce power consumption during periods of inactivity
Authentication Authentication Protocols Encryption Product Safety	WPA and WPA2, 802.1X,(EAP-TLS, TTLS, PEAP, LEAP, EAP-FAST), EAP-SIM, EAP-AKA PAP, CHAP, TLS, GTC, MS-CHAP*, MS-CHAPv2 64-bit and 128-bit WEP, AES-CCMP, TKIP UL, C-UL, CB(IEC60950-1)
Management Capabilities Alerting	Support for Intel® AMT 11.0 on Skylake Y, U, H and DT
Government Compliance	FIPS (Windows® 7 only), FISMA
Client Utility	Intel® PRO/Set Wireless Software v18.1 and later.
Software Support	Microsoft® WHQL certified for Windows® 7, Windows® 8.1 and Windows® 10; Linux
Radio On/Off	Supported in software only
LED output	N/A
Roaming	Supports seamless roaming between respective access points (802.11b, 802.11g, 802.11a/b/g, and 802.11a/b/g/n/ac)
Wake On Wireless	Supported when VPro/AMT is activated, or Windows® 8 without Intel AMT
Wireless Display	Intel WiDi Wireless Display, supports external display resolutions up to 1080p
Country Restrictions	Indonesia supported by BIOS settings

Wireless PAN Standard	Dual Mode Bluetooth* 2.1, 2.1+EDR, 3.0, 3.0+HS, 4.1 (BLE)
Bluetooth Data rates	Up to 3Mbps
Bluetooth Operating Frequency Bands	2.4GHz
Bluetooth Profiles Supported	For Windows 7, includes Streaming Stereo Quality Audio (A2DP), File Transfer (FTP), Dial-up Networking (DUN), Mice/ Keyboards (HID), Printing (BPP), Digital Image Management (transfer, print, remote camera operation) (BIP), AVRCP Support for MS Inbox BT profiles in Windows 8.1 and future OS versions.
Bluetooth Data Encryption	128-bit encryption
Bluetooth Output Power	Power class 2
Temperature	operating temperature 0° to +80° C storage temperature of –40° to +70° C
Humidity	Up to 90% RH non-condensing (at temperatures of 25° C to 35° C)