

# **NEC Express5800/R120f-1M System Configuration Guide**



## **Introduction**

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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# Technical Specification

## Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v3 Product Family
- Up to 768 GB of high speed DDR4 memory
- High energy efficiency with power capping feature and 80 PLUS® Platinum power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

## Specification

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| Model            |                                | R120f-1M                                                                                                                                                                    |                                   |                                   |                                   |
|------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Part Number      |                                | N8100-2209F, N8100-2210F, N8100-2211F                                                                                                                                       |                                   |                                   |                                   |
| Processor        | Type                           | Intel® Xeon® processor E5-2603 v3                                                                                                                                           | Intel® Xeon® processor E5-2609 v3 | Intel® Xeon® processor E5-2620 v3 | Intel® Xeon® processor E5-2640 v3 |
|                  | Clock speed                    | 1.60GHz                                                                                                                                                                     | 1.90 GHz                          | 2.40 GHz                          | 2.60 GHz                          |
|                  | Number of Processors           | 1 or 2                                                                                                                                                                      |                                   |                                   |                                   |
|                  | Cache                          | 15 MB                                                                                                                                                                       |                                   |                                   | 20 MB                             |
|                  | Cores and Threads              | 6C-6T                                                                                                                                                                       |                                   | 6C-12T                            | 8C-16T                            |
| Chipset          |                                | Intel® C612 Chipset                                                                                                                                                         |                                   |                                   |                                   |
| Memory           | Type                           | DDR4-2133 Registered DIMM (4/8/16GB)<br>DDR4-2133 Load Reduced DIMM (32GB)                                                                                                  |                                   |                                   |                                   |
|                  | Standard Capacity              | 0 GB                                                                                                                                                                        |                                   |                                   |                                   |
|                  | Maximum Capacity               | 768 GB (24 x 32 GB)                                                                                                                                                         |                                   |                                   |                                   |
|                  | Memory protection              | ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing                                                                                                             |                                   |                                   |                                   |
| Internal Storage | Standard Capacity              | 0 GB                                                                                                                                                                        |                                   |                                   |                                   |
|                  | Maximum Capacity               | SAS HDD : 14.4 TB (8 x 1.8 TB)<br>SATA HDD : 16 TB (8 x 2 TB)<br>SAS SSD : 3.2 TB ( 8 x 400 GB)<br>SATA SSD : 6.4 TB (8 x 800 GB)                                           |                                   |                                   |                                   |
|                  | Disk Controller                | SATA : 6Gb/s (Integrated)<br>SAS: 12 Gb/s (Optional)                                                                                                                        |                                   |                                   |                                   |
|                  | RAID                           | SATA : RAID 0/1/5/6/10/50/60 (Optional)<br>SAS : RAID 0/1/5/6/10/50/60 (Optional)                                                                                           |                                   |                                   |                                   |
|                  | Hot Plug                       | Supported                                                                                                                                                                   |                                   |                                   |                                   |
|                  | Optical Disk Drive             | Optional                                                                                                                                                                    |                                   |                                   |                                   |
|                  | Optical Drive Bays             | 1                                                                                                                                                                           |                                   |                                   |                                   |
|                  | Disk Drive Bays                | 8                                                                                                                                                                           |                                   |                                   |                                   |
|                  |                                |                                                                                                                                                                             |                                   |                                   |                                   |
| Expansion Slots  | Standard                       | Total: 4 slots available<br>2 PCIe 3.0 x8 (x8 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot   |                                   |                                   |                                   |
|                  | Optional Riser Card (N8116-33) | Total: 4 slots available<br>2 PCIe 3.0 x16 (x16 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot |                                   |                                   |                                   |
| Video            | Controller (VRAM)              | Integrated in Server Management Controller (32MB)                                                                                                                           |                                   |                                   |                                   |
|                  | Resolution / Color             | 1600 x 1200 / 16.7M <sup>1</sup>                                                                                                                                            |                                   |                                   |                                   |
| Interfaces       |                                | 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear)<br>1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear)<br>5 x USB3.0 (2 x front, 2 x rear, 1 x internal)            |                                   |                                   |                                   |

| Model                                                   |                          | R120f-1M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                      |                      |
|---------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|
| Interfaces (Cont'd)                                     |                          | 2 x USB2.0 (2 x rear)<br>1 x Management LAN connector (RJ-45, 1 x rear)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                      |                      |
| Server Management                                       |                          | EXPRESSSCOPE Engine 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                      |                      |
| Redundant Fan                                           |                          | Standard, hot plug                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                      |                      |
| Redundant Power Supply                                  |                          | Optional, hot plug                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                      |                      |
| Power Supply                                            |                          | 1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, or 800 Watt 80 PLUS® Titanium certified hot plug PSU<br>100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                      |                      |
| Power Consumption                                       | (Max. Config, Idling)    | 249 VA<br>/ 247 Watt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 252 VA<br>/ 250 Watt | 248 VA<br>/ 247 Watt | 249 VA<br>/ 247 Watt |
|                                                         | (Max. Config, Operating) | 522 VA<br>/ 518 Watt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 538 VA<br>/ 534 Watt | 627 VA<br>/ 622 Watt | 668 VA<br>/ 664 Watt |
| Acoustical Noise<br>(Sound Pressure Level) <sup>2</sup> | Max. Config, Idling      | 45.8 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                      | 45.8 dB              |
|                                                         | Max. Config, Operating   | 52.7 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                      | 53.5 dB              |
| Dimensions (W x D x H)                                  |                          | 439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                      |                      |
| Weight (Minimum / Maximum)                              |                          | 14.0 kg / 21.2 kg, 30.86 lbs. / 46.74 lbs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                      |                      |
| Temperature, Relative Humidity<br>(non-condensing)      |                          | Operating: 10° to 40° C <sup>3</sup> / 50° to 104° F <sup>3</sup> , 20 to 80%<br>Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                      |                      |
| Regulatory and Safety                                   |                          | FCC, UL, CB, CE, BSMI, UL(Mexico), KC, CCC, RCM, BIS, RoHS, WEEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                      |                      |
| Operating Systems                                       |                          | Microsoft® Windows Server® 2008 Standard (x86)<br>Microsoft® Windows Server® 2008 Enterprise (x86)<br>Microsoft® Windows Server® 2008 R2 Standard<br>Microsoft® Windows Server® 2008 R2 Enterprise<br>Microsoft® Windows Server® 2012 Standard<br>Microsoft® Windows Server® 2012 Datacenter<br>Microsoft® Windows Server® 2012 R2 Standard<br>Microsoft® Windows Server® 2012 R2 Datacenter<br>Red Hat Enterprise Linux 6.5 or later (x86) <sup>4</sup><br>Red Hat Enterprise Linux 6.5 or later (x86_64) <sup>4</sup><br>Red Hat Enterprise Linux 7.1 or later <sup>4</sup><br>VMware ESXi™ 5.1 Update 2<br>VMware ESXi™ 5.5 Update 2<br>VMware ESXi™ 6 |                      |                      |                      |

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> The operable ambient temperature is up to 35°C (95°F) when N8102-615F is installed.

<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>

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| Model       |                      | R120f-1M                                                                   |                                   |                                   |                                   |
|-------------|----------------------|----------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Part Number |                      | N8100-2209F, N8100-2210F, N8100-2211F                                      |                                   |                                   |                                   |
| Processor   | Type                 | Intel® Xeon® processor E5-2650L v3                                         | Intel® Xeon® processor E5-2660 v3 | Intel® Xeon® processor E5-2670 v3 | Intel® Xeon® processor E5-2690 v3 |
|             | Clock speed          | 1.80 GHz                                                                   | 2.60 GHz                          | 2.30 GHz                          | 2.60 GHz                          |
|             | Number of Processors | 1 or 2                                                                     |                                   |                                   |                                   |
|             | Cache                | 30 MB                                                                      | 25 MB                             | 30 MB                             |                                   |
|             | Cores and Threads    | 12C-24T                                                                    | 10C-20T                           | 12C-24T                           |                                   |
| Chipset     |                      | Intel® C612 Chipset                                                        |                                   |                                   |                                   |
| Memory      | Type                 | DDR4-2133 Registered DIMM (4/8/16GB)<br>DDR4-2133 Load Reduced DIMM (32GB) |                                   |                                   |                                   |

| Model                                                |                                | R120f-1M                                                                                                                                                                                                                                                                               |                   |                   |                   |
|------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|
| Memory (Cont'd)                                      | Standard Capacity              | 0 GB                                                                                                                                                                                                                                                                                   |                   |                   |                   |
|                                                      | Maximum Capacity               | 768 GB (24 x 32 GB)                                                                                                                                                                                                                                                                    |                   |                   |                   |
|                                                      | Memory protection              | ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing                                                                                                                                                                                                                        |                   |                   |                   |
| Internal Storage                                     | Standard Capacity              | 0 GB                                                                                                                                                                                                                                                                                   |                   |                   |                   |
|                                                      | Maximum Capacity               | SAS HDD : 14.4 TB (8 x 1.8 TB)<br>SATA HDD : 16 TB (8 x 2 TB)<br>SAS SSD : 3.2 TB ( 8 x 400 GB)<br>SATA SSD : 6.4 TB (8 x 800 GB)                                                                                                                                                      |                   |                   |                   |
|                                                      | Disk Controller                | SATA : 6Gb/s (Integrated)<br>SAS: 12 Gb/s (Optional)                                                                                                                                                                                                                                   |                   |                   |                   |
|                                                      | RAID                           | SATA : RAID 0/1/5/6/10/50/60 (Optional)<br>SAS : RAID 0/1/5/6/10/50/60 (Optional)                                                                                                                                                                                                      |                   |                   |                   |
|                                                      | Hot Plug                       | Supported                                                                                                                                                                                                                                                                              |                   |                   |                   |
|                                                      | Optical Disk Drive             | Optional                                                                                                                                                                                                                                                                               |                   |                   |                   |
|                                                      | Optical Drive Bays             | 1                                                                                                                                                                                                                                                                                      |                   |                   |                   |
|                                                      | Disk Drive Bays                | 8                                                                                                                                                                                                                                                                                      |                   |                   |                   |
| Expansion Slots                                      | Standard                       | Total: 4 slots available<br>2 PCIe 3.0 x8 (x8 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot                                                                                                              |                   |                   |                   |
|                                                      | Optional Riser Card (N8116-33) | Total: 4 slots available<br>2 PCIe 3.0 x16 (x16 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot                                                                                                            |                   |                   |                   |
| Video                                                | Controller (VRAM)              | Integrated in Server Management Controller (32MB)                                                                                                                                                                                                                                      |                   |                   |                   |
|                                                      | Resolution / Color             | 1600 x 1200 / 16.7M <sup>1</sup>                                                                                                                                                                                                                                                       |                   |                   |                   |
| Interfaces                                           |                                | 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear)<br>1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear)<br>5 x USB3.0 (2 x front, 2 x rear, 1 x internal)<br>2 x USB2.0 (2 x rear)<br>1 x Management LAN connector (RJ-45, 1 x rear)                                            |                   |                   |                   |
| Server Management                                    |                                | EXPRESSSCOPE Engine 3                                                                                                                                                                                                                                                                  |                   |                   |                   |
| Redundant Fan                                        |                                | Standard, hot plug                                                                                                                                                                                                                                                                     |                   |                   |                   |
| Redundant Power Supply                               |                                | Optional, hot plug                                                                                                                                                                                                                                                                     |                   |                   |                   |
| Power Supply                                         |                                | 1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, or 800 Watt 80 PLUS® Titanium certified hot plug PSU<br>100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz                                                                                                                       |                   |                   |                   |
| Power Consumption                                    | (Max. Config, Idling)          | 256 VA / 254 Watt                                                                                                                                                                                                                                                                      | 256 VA / 254 Watt | 265 VA / 254 Watt | 256 VA / 254 Watt |
|                                                      | (Max. Config, Operating)       | 582 VA / 478 Watt                                                                                                                                                                                                                                                                      | 706 VA / 701 Watt | 747 VA / 742 Watt | 764 VA / 759 Watt |
| Acoustical Noise (Sound Pressure Level) <sup>2</sup> | Max. Config, Idling            | 45.8 dB                                                                                                                                                                                                                                                                                | 45.8 dB           | 45.8 dB           | 45.8 dB           |
|                                                      | Max. Config, Operating         | 49.4 dB                                                                                                                                                                                                                                                                                | 55.6 dB           | 57.5 dB           | 59.2 dB           |
| Dimensions (W x D x H )                              |                                | 439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)                                                                                                                                                                                                                                    |                   |                   |                   |
| Weight (Minimum / Maximum)                           |                                | 14.0 kg / 21.2 kg, 30.86 lbs. / 46.74 lbs.                                                                                                                                                                                                                                             |                   |                   |                   |
| Temperature, Relative Humidity (non-condensing)      |                                | Operating: 10° to 40° C <sup>3</sup> / 50° to 104° F <sup>3</sup> , 20 to 80%<br>Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%                                                                                                                                               |                   |                   |                   |
| Regulatory and Safety                                |                                | FCC, UL, CB, CE, BSMI, UL(Mexico), KC, CCC, RCM, BIS, RoHS, WEEE                                                                                                                                                                                                                       |                   |                   |                   |
| Operating Systems                                    |                                | Microsoft® Windows Server® 2008 Standard<br>Microsoft® Windows Server® 2008 Enterprise (x86)<br>Microsoft® Windows Server® 2008 R2 Standard<br>Microsoft® Windows Server® 2008 R2 Enterprise<br>Microsoft® Windows Server® 2012 Standard<br>Microsoft® Windows Server® 2012 Datacenter |                   |                   |                   |

| Model                         | R120f-1M                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Systems<br>(Cont'd) | Microsoft® Windows Server® 2012 R2 Standard<br>Microsoft® Windows Server® 2012 R2 Datacenter<br>Red Hat Enterprise Linux 6.5 or later (x86) <sup>4</sup><br>Red Hat Enterprise Linux 6.5 or later (x86_64) <sup>4</sup><br>Red Hat Enterprise Linux 7.1 or later <sup>4</sup><br>VMware ESXi™ 5.1 Update 2<br>VMware ESXi™ 5.5 Update 2<br>VMware ESXi™ 6 |

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> The operable ambient temperature is up to 35°C (95°F) when N8102-615F is installed.

<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>

## (3 / 3)

| Model                          |                      | R120f-1M                                                                                                                                                                    |                                                                                                                                                                           |                                  |                                  |
|--------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Part Number                    |                      | N8100-2209F, N8100-2210F, N8100-2211F                                                                                                                                       |                                                                                                                                                                           |                                  |                                  |
| Processor                      | Type                 | Intel® Xeon® processor E5-2695v3                                                                                                                                            | Intel® Xeon® processor E5-2697v3                                                                                                                                          | Intel® Xeon® processor E5-2698v3 | Intel® Xeon® processor E5-2699v3 |
|                                | Clock speed          | 2.30 GHz                                                                                                                                                                    | 2.60 GHz                                                                                                                                                                  | 2.30 GHz                         | 2.30 GHz                         |
|                                | Number of Processors | 1 to 2                                                                                                                                                                      |                                                                                                                                                                           |                                  |                                  |
|                                | Cache                | 35 MB                                                                                                                                                                       |                                                                                                                                                                           | 40 MB                            | 45 MB                            |
|                                | Cores and Threads    | 14C-28T                                                                                                                                                                     |                                                                                                                                                                           | 16C-32T                          | 18C-36T                          |
| Chipset                        |                      | Intel® C612 Chipset                                                                                                                                                         |                                                                                                                                                                           |                                  |                                  |
| Memory                         | Type                 | DDR4-2133 Registered DIMM (4/8/16GB)<br>DDR4-2133 Load Reduced DIMM (32GB)                                                                                                  |                                                                                                                                                                           |                                  |                                  |
|                                | Standard Capacity    | 0 GB                                                                                                                                                                        |                                                                                                                                                                           |                                  |                                  |
|                                | Maximum Capacity     | 768 GB (24 x 32 GB)                                                                                                                                                         |                                                                                                                                                                           |                                  |                                  |
|                                | Memory protection    | ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing                                                                                                             |                                                                                                                                                                           |                                  |                                  |
| Internal Storage               | Standard Capacity    | 0 GB                                                                                                                                                                        |                                                                                                                                                                           |                                  |                                  |
|                                | Maximum Capacity     | SAS HDD : 14.4 TB (8 x 1.8 TB)<br>SATA HDD : 16 TB (8 x 2 TB)<br>SAS SSD : 3.2 TB ( 8 x 400 GB)<br>SATA SSD : 6.4 TB (8 x 800 GB)                                           |                                                                                                                                                                           |                                  |                                  |
|                                | Disk Controller      | SATA : 6Gb/s (Integrated)<br>SAS: 12 Gb/s (Optional)                                                                                                                        |                                                                                                                                                                           |                                  |                                  |
|                                | RAID                 | SATA : RAID 0/1/5/6/10/50/60 (Optional)<br>SAS : RAID 0/1/5/6/10/50/60 (Optional)                                                                                           |                                                                                                                                                                           |                                  |                                  |
|                                | Hot Plug             | Supported                                                                                                                                                                   |                                                                                                                                                                           |                                  |                                  |
|                                | Optical Disk Drive   | Optional                                                                                                                                                                    |                                                                                                                                                                           |                                  |                                  |
|                                | Optical Drive Bays   | 1                                                                                                                                                                           |                                                                                                                                                                           |                                  |                                  |
|                                | Disk Drive Bays      | 8                                                                                                                                                                           |                                                                                                                                                                           |                                  |                                  |
|                                | Expansion Slots      | Standard                                                                                                                                                                    | Total: 4 slots available<br>2 PCIe 3.0 x8 (x8 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot |                                  |                                  |
| Optional Riser Card (N8116-33) |                      | Total: 4 slots available<br>2 PCIe 3.0 x16 (x16 connector)<br>1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot<br>1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot |                                                                                                                                                                           |                                  |                                  |

| Model                                                |                          | R120f-1M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                   |                   |
|------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|
| Video                                                | Controller (VRAM)        | Integrated in Server Management Controller (32MB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                   |                   |
|                                                      | Resolution / Color       | 1600 x 1200 / 16.7M <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                   |                   |
| Interfaces                                           |                          | 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear)<br>1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear)<br>5 x USB3.0 (2 x front, 2 x rear, 1 x internal)<br>2 x USB2.0 (2 x rear)<br>1 x Management LAN connector (RJ-45, 1 x rear)                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                   |                   |
| Server Management                                    |                          | EXPRESSSCOPE Engine 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                   |                   |
| Redundant Fan                                        |                          | Standard, hot plug                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |                   |                   |
| Redundant Power Supply                               |                          | Optional, hot plug                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |                   |                   |
| Power Supply                                         |                          | 1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, or 800 Watt 80 PLUS® Titanium certified hot plug PSU<br>100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                   |                   |
| Power Consumption                                    | (Max. Config, Idling)    | 262 VA / 260 Watt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 258 VA / 256 Watt | 263 VA / 261 Watt | 260 VA / 258 Watt |
|                                                      | (Max. Config, Operating) | 758 VA / 753 Watt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 766 VA / 761 Watt | 764 VA / 759 Watt | 797 VA / 791 Watt |
| Acoustical Noise (Sound Pressure Level) <sup>2</sup> | Max. Config, Idling      | 45.8 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 45.8 dB           | 45.8dB            | 45.8dB            |
|                                                      | Max. Config, Operating   | 57.5 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 60.2 dB           | 59.2 dB           | 60.2 dB           |
| Dimensions (W x D x H)                               |                          | 439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                   |                   |
| Weight (Minimum / Maximum)                           |                          | 14.0 kg / 21.2 kg, 30.86 lbs. / 46.74 lbs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                   |                   |
| Temperature, Relative Humidity (non-condensing)      |                          | Operating: 10° to 40° C <sup>3</sup> / 50° to 104° F <sup>3</sup> , 20 to 80%<br>Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                   |                   |
| Regulatory and Safety                                |                          | FCC, UL, CB, CE, BSMI, UL(Mexico), KC, CCC, RCM, BIS, RoHS, WEEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                   |                   |
| Operating Systems                                    |                          | Microsoft® Windows Server® 2008 Standard<br>Microsoft® Windows Server® 2008 Enterprise (x86)<br>Microsoft® Windows Server® 2008 R2 Standard<br>Microsoft® Windows Server® 2008 R2 Enterprise<br>Microsoft® Windows Server® 2012 Standard<br>Microsoft® Windows Server® 2012 Datacenter<br>Microsoft® Windows Server® 2012 R2 Standard<br>Microsoft® Windows Server® 2012 R2 Datacenter<br>Red Hat Enterprise Linux 6.5 or later (x86) <sup>4</sup><br>Red Hat Enterprise Linux 6.5 or later (x86_64) <sup>4</sup><br>Red Hat Enterprise Linux 7.1 or later <sup>4</sup><br>VMware ESX™i 5.1 Update 2<br>VMware ESX™i 5.5 Update 2<br>VMware ESXi™ 6 |                   |                   |                   |

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

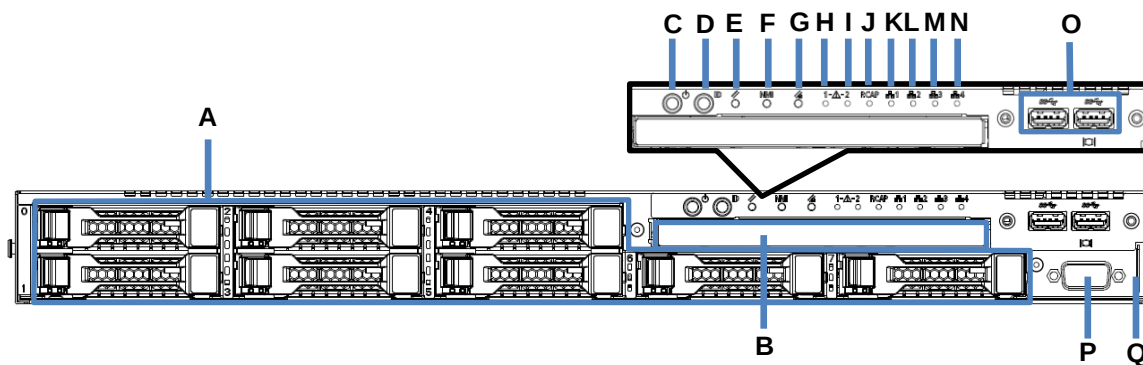
<sup>3</sup> The operable ambient temperature is up to 35°C (95°F) when N8102-615F is installed.

<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>

## External Views

### Front and Rear Views

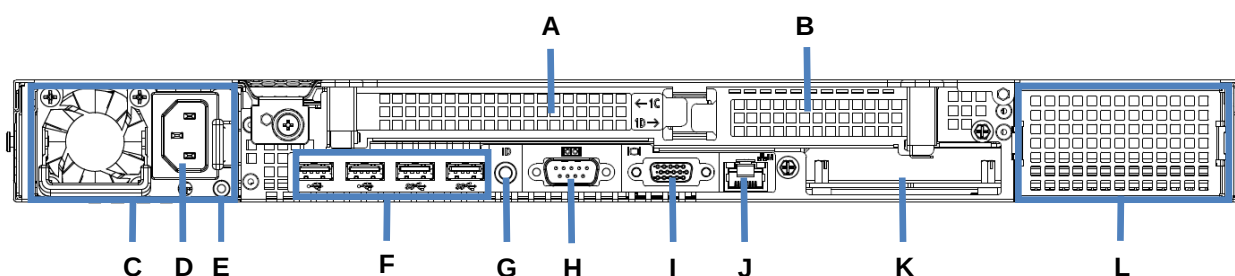
#### Front View



#### Legend

|    |                          |    |                         |
|----|--------------------------|----|-------------------------|
| A. | 2.5-inch Drive Bays      | J. | Power Capping LED       |
| B. | Optical Drive Bay        | K. | Data LAN 1 Activity LED |
| C. | Power Button / Power LED | L. | Data LAN 2 Activity LED |
| D. | UID LED Button           | M. | Data LAN 3 Activity LED |
| E. | System Reset Button      | N. | Data LAN 4 Activity LED |
| F. | Dump (NMI) Button        | O. | USB Connectors          |
| G. | BMC Reset Button         | P. | Display Connector       |
| H. | System Status LED 1      | Q. | Pull-out Tab            |
| I. | System Status LED 2      |    |                         |

#### Rear View

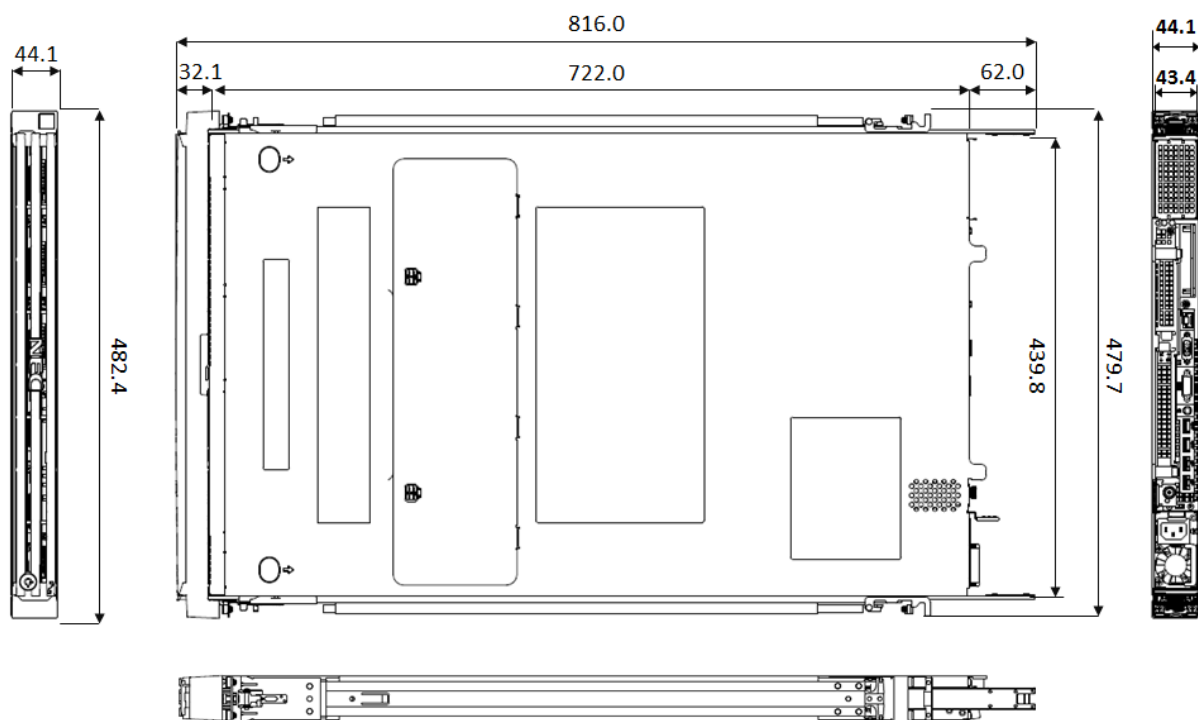


#### Legend

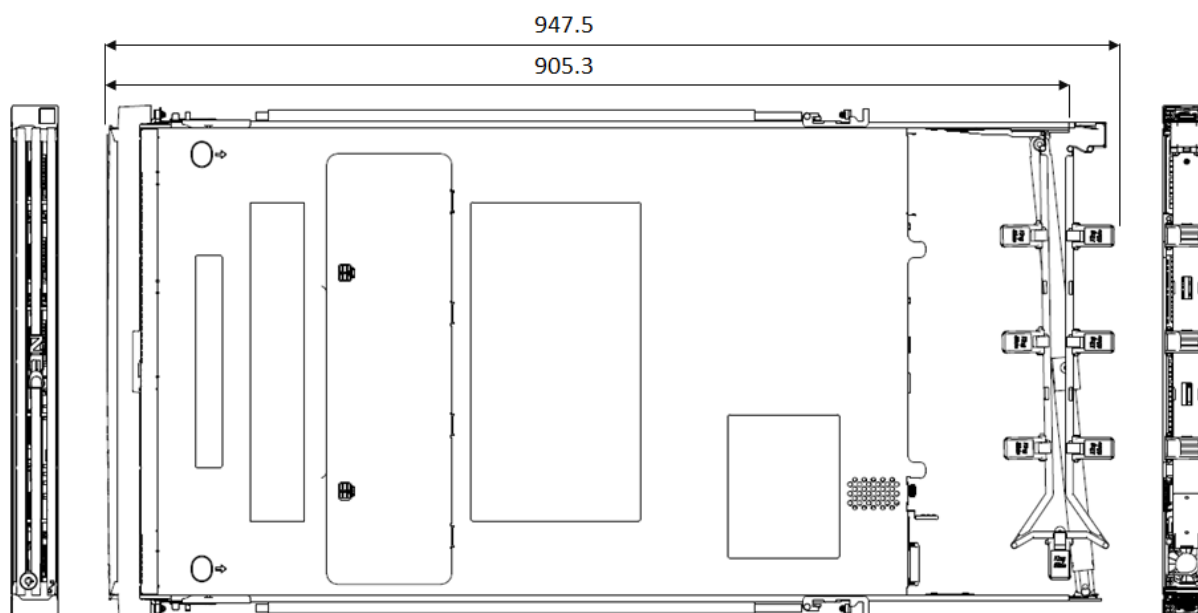
|    |                        |    |                              |
|----|------------------------|----|------------------------------|
| A. | PCI Slot (Full-Height) | G. | UID Button/LED               |
| B. | PCI Slot (Low-Profile) | H. | Serial Port Connector        |
| C. | Power Supply           | I. | VGA Connector                |
| D. | AC Inlet               | J. | Management LAN Connector     |
| E. | AC Power LED           | K. | LOM Card Slot                |
| F. | USB Connectors         | L. | Additional Power Supply Slot |

## Dimensions (mm)

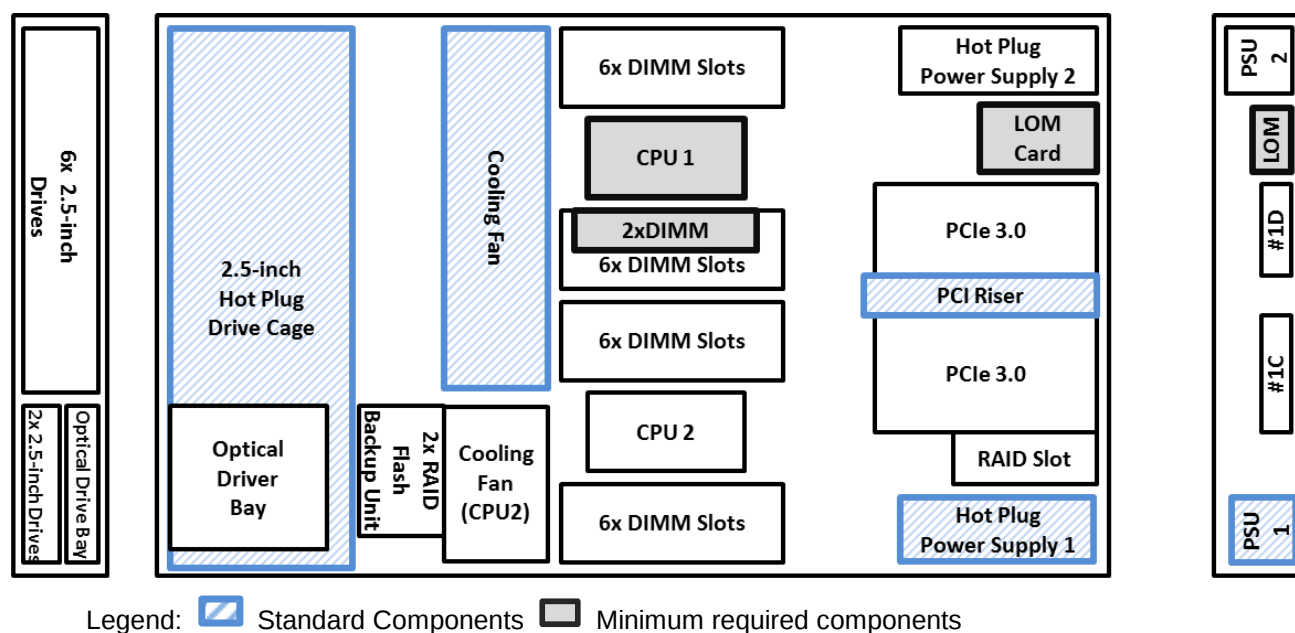
### Without Cable Arm



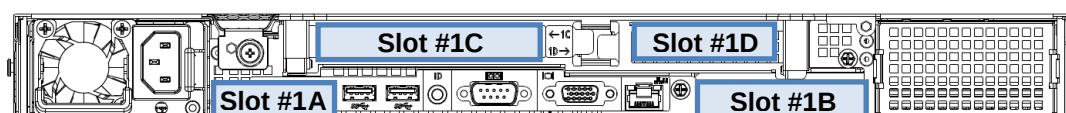
### With Cable Arm



## Configuration Diagram



## Expansion Slots



| Legend                  |     |                                                                   | Remarks        |
|-------------------------|-----|-------------------------------------------------------------------|----------------|
| Common                  | #1A | PCIe 3.0 x8, x8 connector, for a dedicated RAID controller        |                |
|                         | #1B | PCIe 3.0 x8, x8 connector, for a dedicated LOM Card               |                |
|                         | #1C | PCIe 3.0 x8, x8 connector, Full-height, up to 220 mm length       |                |
|                         | #1D | PCIe 3.0 x8, x8 connector, Low-profile, up to 220 mm length       |                |
| PCIe x16 Riser Card Kit | #1C | PCIe 3.0 x16, x16 connector, Full-height, up to 220 mm length     | 2 CPU required |
|                         | #1D | PCIe 3.0 x16, x16 connector, Low-profile, up to 220/312 mm length | 2 CPU required |

# Server Configuration

## 1 Base Models

| Product Name / Description                                                                                                                                                                                        | Part Number |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>NEC Express5800/R120f-1M Server</b><br>no processor, no RAM, no HDD, no ODD, no LOM Card<br>Including : 1 x 460 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage, EXPRESSBUILDER DVD | N8100-2209F |
| <b>NEC Express5800/R120f-1M Server</b><br>no processor, no RAM, no HDD, no ODD, no LOM Card<br>Including : 1 x 800 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage, EXPRESSBUILDER DVD | N8100-2210F |
| <b>NEC Express5800/R120f-1M Server</b><br>no processor, no RAM, no HDD, no ODD, no LOM Card<br>Including : 1 x 800 Watt 80 PLUS® Titanium Power Supply Unit, Front Bezel, 2.5-inch Drive Cage, EXPRESSBUILDER DVD | N8100-2211F |

### NOTE:

- The base model must be ordered with a processor kit, a memory kit, and a LOM card.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:  
[http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector\\_G01.xls](http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls)

## 2 Processors and Heat Sink

Available sockets: 2

| Category                                     | Product Name / Description                                                                             | Part Number |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------|
| <b>Processors</b><br>1 Processor<br>Required | <b>Xeon E5-2603 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2603 v3 (1.60 GHz, 6C/6T, 15 MB)     | N8101-768F  |
|                                              | <b>Xeon E5-2609 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2609 v3 (1.90 GHz, 6C/6T, 15 MB)     | N8101-769F  |
|                                              | <b>Xeon E5-2620 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2620 v3 (2.40 GHz, 6C/12T, 15 MB)    | N8101-770F  |
|                                              | <b>Xeon E5-2640 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2640 v3 (2.60 GHz, 8C/16T, 20 MB)    | N8101-773F  |
|                                              | <b>Xeon E5-2650L v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2650L v3 (1.80 GHz, 12C/24T, 30 MB) | N8101-775F  |
|                                              | <b>Xeon E5-2660 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2660 v3 (2.60 GHz, 10C/20T, 25 MB)   | N8101-776F  |
|                                              | <b>Xeon E5-2670 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2670 v3 (2.30 GHz, 12C/24T, 30 MB)   | N8101-778F  |
|                                              | <b>Xeon E5-2690 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2690 v3 (2.60 GHz, 12C/24T, 30 MB)   | N8101-779F  |
|                                              | <b>Xeon E5-2695 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2695 v3 (2.30 GHz, 14C/28T, 35 MB)   | N8101-930F  |
|                                              | <b>Xeon E5-2697 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2697 v3 (2.60 GHz, 14C/28T, 35 MB)   | N8101-931F  |
|                                              | <b>Xeon E5-2698 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2698 v3 (2.30 GHz, 16C/32T, 40 MB)   | N8101-932F  |
|                                              | <b>Xeon E5-2699 v3 Processor Kit</b><br>Intel® Xeon® Processor E5-2699 v3 (2.30 GHz, 18C/36T, 45 MB)   | N8101-933F  |
| <b>Heat Sink</b> 1st                         | <b>Processor Heat Sink</b><br>For 1 <sup>st</sup> Processor                                            | (Standard)  |

**2nd Processor Heat Sink**  
For 2<sup>nd</sup> Processor, including cooling fan kit

N8101-780F

**NOTE:**

- Minimum one processor kit from above must be installed.
- The processors must be the same to configure dual processor system.

### The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

| Number of Logical Processors Supported by Operating Systems |                  | Maximum Available Number of logical Processors |
|-------------------------------------------------------------|------------------|------------------------------------------------|
| Microsoft Windows Server 2008 Standard (x86)                | 32 <sup>1</sup>  | 32                                             |
| Microsoft Windows Server 2008 Enterprise (x86)              |                  |                                                |
| Microsoft Windows Server 2008 R2 Standard (x64)             | 256 <sup>1</sup> | 72                                             |
| Microsoft Windows Server 2008 R2 Enterprise (x64)           |                  |                                                |
| Microsoft Windows Server 2012 Standard                      | 640 <sup>1</sup> | 72                                             |
| Microsoft Windows Server 2012 Datacenter                    |                  |                                                |
| Microsoft Windows Server 2012 R2 Standard                   |                  |                                                |
| Microsoft Windows Server 2012 R2 Datacenter                 |                  |                                                |
| Red Hat Enterprise Linux 6                                  | 32               | 32                                             |
| Red Hat Enterprise Linux 6 (x86_64)                         | 240              | 72                                             |
| Red Hat Enterprise Linux 7                                  |                  |                                                |
| VMware ESXi 5.1                                             | 160              | 72                                             |
| VMware ESXi 5.5                                             | 320              | 72                                             |
| VMware ESXi 6.0                                             | 480              | 72                                             |

<sup>1</sup> The maximum numbers of logical processors when using Hyper-V are below

- Windows Server 2008 : 24
- Windows Server 2008 R2 : 64
- Windows Server 2012, Windows Server 2012 R2 : 320

## 3 Memory

### 3.1 Memory Configuration

Refer to the section in accordance with your operating system and memory configuration:

#### Other than Windows server 2008 Standard

- Independent Channel Configuration: Refer to [3.2.1](#)
- Memory Sparing Configuration: Refer to [3.2.2](#)
- Memory Mirroring / Memory Lockstep Configuration: Refer to [3.2.3](#)

#### Microsoft Windows 2008 Standard

- Independent Channel Configuration: Refer to [3.3.1](#)

### 3.2 Other than Windows server 2008 Standard

#### 3.2.1 Independent Channel Configuration

Available slots: 12 per processor

| Category                   | Product Name / Description                                                                           | Part Number |
|----------------------------|------------------------------------------------------------------------------------------------------|-------------|
| Registered DIMM (RDIMM)    | <b>8GB DDR4-2133 REG Memory Kit (2x4GB)</b><br>2 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133)      | N8102-611F  |
|                            | <b>16GB DDR4-2133 REG Memory Kit (2x8GB)</b><br>2 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)     | N8102-612F  |
|                            | <b>32GB DDR4-2133 REG Memory Kit (2x16GB)</b><br>2 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133)   | N8102-613F  |
| Load Reduced DIMM (LRDIMM) | <b>64GB DDR4-2133 LR Memory Kit (2x32GB)</b><br>2 x 32GB Load Reduced ECC DIMM, DDR4-2133(PC4-2133)  | N8102-614F  |
|                            | <b>128GB DDR4-2133 LR Memory Kit (2x64GB)</b><br>2 x 64GB Load Reduced ECC DIMM, DDR4-2133(PC4-2133) | N8102-615F  |

#### NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of two (four identical DIMMs) for quad-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of RDIMM and LRDIMM are not supported.
- The operable ambient temperature is up to 35° C when N8102-615F is installed.
- N8102-615F is a make-to-order product. Please consult your sales representative in regard to production lead time.

#### 3.2.2 Memory Sparing Configuration

Available slots: 12 per processor

| Product Name / Description                                                                         | Part Number |
|----------------------------------------------------------------------------------------------------|-------------|
| <b>24GB DDR4-2133 REG Memory Kit (3x8GB)</b><br>3 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)   | N8102-622   |
| <b>48GB DDR4-2133 REG Memory Kit (3x16GB)</b><br>3 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133) | N8102-623   |

#### NOTE:

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.
- When two processors are installed, balance the DIMMs across the two processors.
- The logical memory capacity at the time of memory sparing becomes two-thirds of physical capacity

with configurations less than 8GB DIMM and five-sixth physical capacity with configurations more than 16GB DIMM.

- The maximum memory speed is 1600 MHz.

### 3.2.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 12 per processor

| Product Name / Description                                                                          | Part Number |
|-----------------------------------------------------------------------------------------------------|-------------|
| <b>16GB DDR4-2133 REG Memory Kit (2x8GB)</b><br>2 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)    | N8102-618   |
| <b>32GB DDR4-2133 REG Memory Kit (2x16GB)</b><br>2 x 16GB Registered ECC DIMM, DDR4-2133 (PC4-2133) | N8102-619   |

#### NOTE:

- Minimum one memory kit per processor must be installed.

## 3.3 Windows Server 2008 Standard

### 3.3.1 Independent Channel Configuration

Available slots: 1

| Product Name / Description                                                                      | Part Number |
|-------------------------------------------------------------------------------------------------|-------------|
| <b>4GB DDR4-2133 REG Memory Kit (1x4GB)</b><br>1 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133) | N8102-610   |

#### NOTE:

- Only one Memory Kit can be installed regardless of the number of processors.

### Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

|                                  | Independent Channel  | Memory Sparing                                                    | Memory Lockstep                 | Memory Mirroring                                   |
|----------------------------------|----------------------|-------------------------------------------------------------------|---------------------------------|----------------------------------------------------|
| <b>Performance</b>               | Best                 | Better                                                            | Better                          | Good                                               |
| <b>Data Protection</b>           | No                   | Multiple single bit error protection                              | No                              | Multiple single bit and multi bit error protection |
| <b>Redundancy</b>                | No                   | Partly                                                            | No                              | Fully                                              |
| <b>Data Correction</b>           | ECC, x4 SDDC         | ECC, x4 SDDC                                                      | ECC, x8 SDDC                    | ECC, x4 SDDC                                       |
| <b>Available Memory</b>          | Full physical memory | 2/3 physical memory (8GB DIMM)<br>5/6 physical memory (16GB DIMM) | Full physical memory            | Half physical memory                               |
| <b>Available Memory Channels</b> | 4                    | 4                                                                 | 4                               | 4                                                  |
| <b>Notes</b>                     | -                    | All DIMMs in the system must be identical.                        | Paired DIMMs must be identical. | Paired DIMMs must be identical.                    |

### Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR4 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

The maximum memory transfer rate is 1600 MHz with Memory Sparing Configuration.

| Processor Type | Populated DIMMs    | # of DIMMs per processor | DIMM Speed |
|----------------|--------------------|--------------------------|------------|
| E5-2603 v3     | RDIMM: 4, 8, 16 GB | -                        | 1600 MHz   |
| E5-2609 v3     | LRDIMM: 32GB       | -                        | 1600 MHz   |
| E5-2620 v3     | RDIMM: 4, 8, 16 GB | Up to 8 DIMMs -          | 1866 MHz   |
| E5-2640 v3     |                    | 10 or more DIMMs         | 1600 MHz   |
|                | LRDIMM: 32GB       | Up to 8 DIMMs -          | 1866 MHz   |
|                |                    | 10 or more DIMMs         | 1600 MHz   |
| E5-2650L v3    | RDIMM: 4, 8, 16 GB | Up to 8 DIMMs -          | 2133 MHz   |
| E5-2660 v3     |                    | 10 or more DIMMs         | 1600 MHz   |
| E5-2670 v3     | LRDIMM: 32GB       | Up to 8 DIMMs -          | 2133 MHz   |
| E5-2690 v3     |                    | 10 or more DIMMs         | 1600MHz    |
| E5-2695 v3     |                    |                          |            |
| E5-2697 v3     |                    |                          |            |
| E5-2698 v3     |                    |                          |            |
| E5-2699 v3     |                    |                          |            |

## Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

| Maximum Memory Size Supported by Operating Systems          |       | Maximum Available Memory                            |
|-------------------------------------------------------------|-------|-----------------------------------------------------|
| Microsoft Windows Server 2008 Standard (x86) <sup>1</sup>   | 4 GB  | 4 GB (HW-DEP enabled)<br>App. 2 GB(HW-DEP disabled) |
| Microsoft Windows Server 2008 R2 Standard <sup>1</sup>      | 32 GB | 32 GB                                               |
| Microsoft Windows Server 2008 Enterprise (x86) <sup>1</sup> | 64 GB | 64 GB                                               |
| Microsoft Windows Server 2008 R2 Enterprise <sup>1</sup>    | 4 TB  | 768GB                                               |
| Microsoft Windows Server 2012 Standard <sup>1</sup>         | 16 GB | 768GB                                               |
| Microsoft Windows Server 2012 Datacenter <sup>1</sup>       |       |                                                     |
| Microsoft Windows Server 2012 R2 Standard <sup>1</sup>      |       |                                                     |
| Microsoft Windows Server 2012 R2 Datacenter <sup>1</sup>    |       |                                                     |
| Red Hat Enterprise Linux 6                                  | 3 TB  | 16 GB                                               |
| Red Hat Enterprise Linux 6 (x86_64)                         | 6 TB  | 768GB                                               |
| Red Hat Enterprise Linux 7                                  |       |                                                     |
| VMware ESXi 5.1 <sup>2</sup>                                | 2 TB  | 768GB                                               |
| VMware ESXi 5.5 <sup>2</sup>                                | 4 TB  | 768GB                                               |
| VMware ESXi 6.0 <sup>3</sup>                                | 6 TB  | 512 GB                                              |

<sup>1</sup> The maximum available memory size of Hyper-V systems are below:

- Windows Server 2008 Standard (x64) and Windows Server 2008 R2 Standard : 32 GB
- Windows Server 2008 Enterprise (x64) and Windows Server 2008 R2 Enterprise : 1TB
- Windows Server 2012, Windows Server 2012 R2: 4 TB

<sup>2</sup> Up to 1TB of main memory is available to each virtual machine.

<sup>3</sup> Up to 4TB of main memory is available to each virtual machine.

## 4 Internal Hard Disk Drives

### 4.1 RAID Configuration

Refer to the section in accordance with your OS and RAID configuration. For example, when you would like to configure RAID 0/1/10 1GB cache with Windows Server 2012 R2, refer to the section 4.2.2 for the required components and then refer to the section 4.3.2 for the hard drives.

| Operating System                                        | Supported RAID configuration |                       | Supported HDD/SSD     |
|---------------------------------------------------------|------------------------------|-----------------------|-----------------------|
|                                                         | RAID and Cache               | Section               |                       |
| Windows Server 2008                                     | Non-RAID (Embedded SATA)     | <a href="#">4.2.1</a> | <a href="#">4.3.1</a> |
| Windows Server 2008 R2                                  | RAID 0/1/10 1GB Cache        | <a href="#">4.2.2</a> | <a href="#">4.3.2</a> |
| Red Hat Enterprise Linux 6                              | RAID 5/6/50/60 1GB Cache     | <a href="#">4.2.3</a> |                       |
| KVM in Red Hat Enterprise Linux 6 (x86_64)              | RAID 5/6/50/60 2GB Cache     | <a href="#">4.2.4</a> |                       |
| VMware ESXi                                             |                              |                       |                       |
| Windows Server 2012                                     | Non-RAID (Embedded SATA)     | <a href="#">4.2.1</a> | <a href="#">4.3.1</a> |
| Windows Server 2012 R2                                  | RAID 0/1/10 1GB Cache        | <a href="#">4.2.2</a> | <a href="#">4.3.3</a> |
| Red Hat Enterprise Linux 6 (x86_64) without KVM feature | RAID 5/6/50/60 1GB Cache     | <a href="#">4.2.3</a> |                       |
| Red Hat Enterprise Linux 7                              | RAID 5/6/50/60 2GB Cache     | <a href="#">4.2.4</a> |                       |

**NOTE:**

- Up to four hard drives can be installed in the Embedded SATA configuration.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed in each drive cage.
- It is recommended to set RAID array configuration drives less than eight per disk group in order to minimize the risk of becoming multiple hard drives failure.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

### 4.2 Required Components for RAID Configuration

#### 4.2.1 Up to four Drives with embedded SATA Controller

| Category           | Product Name / Description                                          | Part Number |
|--------------------|---------------------------------------------------------------------|-------------|
| Storage Controller | <b>Embedded SATA Controller</b><br>4 x 6Gb/s SATA                   | (Standard)  |
| Cable              | <b>Internal SATA Cable</b><br>1 x mini-SAS HD to 1 x mini-SAS HD    | (Standard)  |
| Drive Cage         | <b>2.5-inch Drive Cage</b><br>8 x 2.5-inch Hot-plug hard drive bays | (Standard)  |

**NOTE:**

- Up to 4 SATA drives are supported.
- For supported HDD/SSD, refer to [4.3.1](#)
- Hot plug insertion/removal are not supported in the configuration.

#### 4.2.2 RAID 0/1 Controller with 1 GB Cache

| Category                                     | Product Name / Description                                                                                                          | Part Number |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Storage Controller</b><br><b>Required</b> | <b>RAID Controller (1GB, RAID 0/1)</b><br>LSI MegaRAID SAS 9362-8i<br>RAID 0/1/10, 1GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s | N8103-176   |
| <b>Flash Backup</b><br><b>Recommended</b>    | <b>Flash Backup Unit</b><br>for LSI MegaRAID SAS 9362-8i<br>650mm Cable for Flash Backup Unit included                              | N8103-181   |
| <b>Cable</b>                                 | <b>Internal SAS/SATA Cable</b><br>1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets                                                        | (Standard)  |
| <b>Drive Cage</b>                            | <b>2.5-inch Drive Cage</b><br>8 x 2.5-inch hot plug drive bays                                                                      | (Standard)  |

**NOTE:**

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- For Supported HDD/SSD, refer to [4.3.2](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refer to [4.3.3](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed.

#### 4.2.3 RAID 5/6 Controller with 1 GB Cache

| Category                                     | Product Name / Description                                                                                                                       | Part Number |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Storage Controller</b><br><b>Required</b> | <b>RAID Controller (1GB, RAID 0/1/5/6)</b><br>LSI MegaRAID SAS 9362-8i<br>RAID0/1/5/6/10/50/60, 1GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s | N8103-177   |
| <b>Flash Backup</b><br><b>Recommended</b>    | <b>Flash Backup Unit</b><br>for LSI MegaRAID SAS 9362-8i<br>650mm Cable for Flash Backup Unit included                                           | N8103-181   |
| <b>Cable</b>                                 | <b>Internal SAS/SATA Cable</b><br>1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets                                                                     | (Standard)  |
| <b>Drive Cage</b>                            | <b>2.5-inch Drive Cage</b><br>8 x 2.5-inch hot plug drive bays                                                                                   | (Standard)  |

**NOTE:**

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- For Supported HDD/SSD, refer to [4.3.2](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refer to [4.3.3](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed.

#### 4.2.4 RAID 5/6 Controller with 2 GB Cache

| Category                                     | Product Name / Description                                                                                                       | Part Number |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Storage Controller</b><br><b>Required</b> | <b>RAID Controller (2GB, RAID 0/1/5/6)</b><br>LSI MegaRAID SAS 9362-8i<br>RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, 12Gb/s | N8103-178   |
| <b>Flash Backup</b><br><b>Recommended</b>    | <b>Flash Backup Unit</b><br>for LSI MegaRAID SAS 9362-8i<br>650mm Cable for Flash Backup Unit included                           | N8103-181   |
| <b>Cable</b>                                 | <b>Internal SAS/SATA Cable</b><br>1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets                                                     | (Standard)  |
| <b>Drive Cage</b>                            | <b>2.5-inch Drive Cage</b><br>8 x 2.5-inch hot plug drive bays                                                                   | (Standard)  |

##### NOTE:

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- For Supported HDD/SSD, refer to [4.3.2](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refer to [4.3.3](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed.

### 4.3 Supported HDD/SSD

#### 4.3.1 For Embedded SATA Controller

| Category                                           | Product Name / Description                                                                                                      | Part Number |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Drive</b><br><b>4 slots</b><br><b>available</b> | <b>SATA HDD</b><br><b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector | N8150-487   |
|                                                    | <b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector                    | N8150-488   |
|                                                    | <b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector                        | N8150-489   |

#### 4.3.2 For RAID Controller Configuration (1)

For Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, KVM in Red Hat Enterprise Linux 6(x86\_64), or VMware.

| Category                                           | Product Name / Description                                                                                                    | Part Number |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Drive</b><br><b>8 slots</b><br><b>available</b> | <b>SAS HDD</b><br><b>300GB 10K Hot Plug 2.5-inch SAS HDD</b><br>1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector | N8150-479   |
|                                                    | <b>450GB 10K Hot Plug 2.5-inch SAS HDD</b><br>1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector                   | N8150-480   |
|                                                    | <b>600GB 10K Hot Plug 2.5-inch SAS HDD</b><br>1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector                   | N8150-481   |

|                 |                                                              |           |
|-----------------|--------------------------------------------------------------|-----------|
|                 | <b>900GB 10K Hot Plug 2.5-inch SAS HDD</b>                   | N8150-482 |
|                 | 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector |           |
|                 | <b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b>                   | N8150-483 |
|                 | 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector |           |
|                 | <b>300GB 15K Hot Plug 2.5-inch SAS HDD</b>                   | N8150-485 |
|                 | 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector |           |
|                 | <b>450GB 15K Hot Plug 2.5-inch SAS HDD</b>                   | N8150-486 |
|                 | 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector |           |
|                 | <b>600GB 15K Hot Plug 2.5-inch SAS HDD</b>                   | N8150-518 |
|                 | 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector |           |
| <b>SATA HDD</b> | <b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b>                 | N8150-487 |
|                 | 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector |           |
|                 | <b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b>                 | N8150-488 |
|                 | 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector |           |
|                 | <b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b>                   | N8150-489 |
|                 | 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector   |           |
| <b>SAS SSD</b>  | <b>200GB Hot Plug 2.5-inch SAS SSD</b>                       | N8150-721 |
|                 | 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector      |           |
|                 | <b>400GB Hot Plug 2.5-inch SAS SSD</b>                       | N8150-722 |
|                 | 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector      |           |
| <b>SATA SSD</b> | <b>200GB Hot Plug 2.5-inch SATA SSD</b>                      | N8150-725 |
|                 | 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector        |           |
|                 | <b>400GB Hot Plug 2.5-inch SATA SSD</b>                      | N8150-726 |
|                 | 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector        |           |
|                 | <b>800GB Hot Plug 2.5-inch SATA SSD</b>                      | N8150-727 |
|                 | 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector        |           |

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed.

**4.3.3 For RAID Controller Configuration (2)**

For Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM, or Red Hat Enterprise Linux 7

| Category                                  |                       | Product Name / Description                                    | Part Number |
|-------------------------------------------|-----------------------|---------------------------------------------------------------|-------------|
| <b>Drive Standard : 8 slots available</b> | <b>SAS HDD (512B)</b> | <b>300GB 10K Hot Plug 2.5-inch SAS HDD</b>                    | N8150-479   |
|                                           |                       | 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector |             |
|                                           |                       | <b>450GB 10K Hot Plug 2.5-inch SAS HDD</b>                    | N8150-480   |
|                                           |                       | 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector |             |
|                                           |                       | <b>600GB 10K Hot Plug 2.5-inch SAS HDD</b>                    | N8150-481   |
|                                           |                       | 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector |             |

|                                |                                                                                                                 |           |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------|
|                                | <b>900GB 10K Hot Plug 2.5-inch SAS HDD</b><br>1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm,<br>512B sector   | N8150-482 |
|                                | <b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b><br>1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm,<br>512B sector   | N8150-483 |
|                                | <b>300GB 15K Hot Plug 2.5-inch SAS HDD</b><br>1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm,<br>512B sector   | N8150-485 |
|                                | <b>450GB 15K Hot Plug 2.5-inch SAS HDD</b><br>1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm,<br>512B sector   | N8150-486 |
|                                | <b>600GB 15K Hot Plug 2.5-inch SAS HDD</b><br>1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm,<br>512B sector   | N8150-518 |
| <b>SAS<br/>HDD<br/>(4KB)</b>   | <b>1.8TB 10K Hot Plug 2.5-inch SAS HDD</b><br>1 x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm,<br>4KB sector    | N8150-490 |
| <b>SATA<br/>HDD<br/>(512B)</b> | <b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm,<br>512B sector | N8150-487 |
|                                | <b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm,<br>512B sector | N8150-488 |
|                                | <b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm,<br>512B sector     | N8150-489 |
| <b>SATA<br/>HDD<br/>(4KB)</b>  | <b>2TB 7.2K Hot Plug 2.5-inch SATA HDD</b><br>1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm,<br>4KB sector      | N8150-521 |
| <b>SAS<br/>SSD</b>             | <b>200GB Hot Plug 2.5-inch SAS SSD</b><br>1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s,<br>512B sector            | N8150-721 |
|                                | <b>400GB Hot Plug 2.5-inch SAS SSD</b><br>1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s,<br>512B sector            | N8150-722 |
| <b>SATA<br/>SSD</b>            | <b>200GB Hot Plug 2.5-inch SATA SSD</b><br>1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s,<br>512B sector             | N8150-725 |
|                                | <b>400GB Hot Plug 2.5-inch SATA SSD</b><br>1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s,<br>512B sector             | N8150-726 |
|                                | <b>800GB Hot Plug 2.5-inch SATA SSD</b><br>1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s,<br>512B sector             | N8150-727 |

**NOTE:**

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed.
- The 4KB sector drives are make-to-order products. Please consult your sales representative in regard to production lead time.
- When you select 4KB sector HDD, confirm whether your applications support hard drives with 4 KB sector size. For more information, visit the NEC website at:  
[http://www.nec.com/en/global/prod/express/svropt/hdd/collateral/4KHDD\\_Precautions\\_EN.pdf](http://www.nec.com/en/global/prod/express/svropt/hdd/collateral/4KHDD_Precautions_EN.pdf)
- 512B sector HDD and 4KB sector HDD cannot be mixed.

## 5 Optical Drive

| Category                            | Product Name / Description                                                                                                                                                                                                                                     | Part Number |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Internal</b><br>1 slot available | <b>Internal Slim DVD-ROM drive</b><br>Slim DVD-ROM drive<br>DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW)<br>CD read speed: 24x (CD-ROM / CD-R/RW)                                                                                                             | N8151-123   |
|                                     | <b>Internal DVD Super Multi Drive</b><br>Slim DVD Super Multi drive, not including writing software<br>DVD Read speed: 8x (DVD-R / DVD-RW / DVD-R DL / DVD+R / DVD+RW / DVD+R DL / DVD-ROM)<br>DVD-RAM read speed: 5x<br>CD read speed: 24x (CD-ROM / CD-R/RW) | N8151-124F  |
| <b>External</b>                     | <b>External DVD Super MULTI Drive</b><br>USB, Slim DVD Super Multi drive, not including writing software                                                                                                                                                       | N8160-97F   |

### NOTE:

- Up to 1 optical drive can be connected.

## 6 PCI Card

Please refer to [Supported PCI Cards and Installable Slots](#) with regard to the position of PCI slot which can mount PCI card supported.

### 6.1 PCI Riser Card

| Product Name / Description                                          | Part Number |
|---------------------------------------------------------------------|-------------|
| <b>PCIe Riser Card Kit</b><br>8 x PCIe 3.0 x8                       | (Standard)  |
| <b>PCIe x16 Riser Card Kit</b><br>2 x PCIe 3.0 x16, 2 x PCIe 3.0 x8 | N8116-33    |

### NOTE:

- N8116-33 PCIe x16 Riser Card Kit is supported in dual-processor configuration.

### 6.2 Network Interface Controller

| Category                                                                                                                                                                             | Product Name / Description                                                                               | Part Number |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------|
| <b>LOM Card</b>                                                                                                                                                                      | <b>1GbE Quad Port 1000BASE-T LOM Card</b><br>Broadcom® BCM5719<br>PCIe 2.0 x4                            | N8104-154F  |
|                                                                                                                                                                                      | <b>10GbE Dual Port 10GBASE-T LOM Card</b><br>Intel Ethernet Controller X540<br>PCIe 2.0(x8)              | N8104-155F  |
|                                                                                                                                                                                      | <b>Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card</b><br>Qlogic NetXtreme II BCM57800S<br>PCIe 2.0 x8 | N8104-156F  |
| <b>NOTE:</b> <ul style="list-style-type: none"> <li>N8104-129 SFP+ Module is required to connect with an optical cable.</li> <li>Up to two SFP+ Modules can be installed.</li> </ul> |                                                                                                          |             |
| <b>Adapter</b>                                                                                                                                                                       | <b>1GbE 1000BASE-T Adapter</b><br>Broadcom® BCM5718 Gigabit Ethernet Controller<br>PCIe 2.0 x1           | N8104-150   |

|                    |                                                                                        |           |
|--------------------|----------------------------------------------------------------------------------------|-----------|
|                    | <b>Dual Port 1000BASE-T Adapter</b>                                                    | N8104-151 |
|                    | Broadcom ® BCM5718 Gigabit Ethernet Controller<br>PCIe 2.0 x1                          |           |
|                    | <b>Dual Port 1000BASE-T Adapter</b>                                                    | N8104-145 |
|                    | Intel® 82580 Gigabit Ethernet Controller<br>PCIe 2.0 x4                                |           |
|                    | <b>NOTE:</b>                                                                           |           |
|                    | - PXE boot is not supported on UEFI environment.                                       |           |
|                    | <b>Quad Port 1000BASE-T Adapter</b>                                                    | N8104-152 |
|                    | Broadcom ® BCM5719 Gigabit Ethernet Controller<br>PCIe 2.0 x4                          |           |
|                    | <b>NOTE:</b>                                                                           |           |
|                    | - Network cables with RJ-45 plug covers cannot be used.                                |           |
| <b>10GbE</b>       | <b>Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)</b>                                       | N8104-148 |
|                    | Intel 82599ES 10 Gigabit Ethernet Controller<br>PCIe 2.0 x8, Low Profile / Full Height |           |
|                    | <b>NOTE:</b>                                                                           |           |
|                    | - N8104-129 SFP+ Module is required to connect with an optical cable.                  |           |
|                    | - Up to 2 SFP+ Modules can be installed.                                               |           |
|                    | <b>10GBASE SFP+ Adapter (SFP+/2ch)</b>                                                 | N8104-149 |
|                    | Qlogic NetXtreme II BCM57810S<br>PCIe 2.0 x8, Low Profile / Full Height                |           |
|                    | <b>NOTE:</b>                                                                           |           |
|                    | - N8104-129 SFP+ Module is required to connect with an optical cable.                  |           |
|                    | - The latest driver is required for Window Server 2008 and Windows Server 2008 R2.     |           |
|                    | <b>Dual Port 10GBASE-T Adapter</b>                                                     | N8104-153 |
|                    | Intel X540-BT2<br>PCIe 2.1 x8, Low Profile / Full Height                               |           |
| <b>SFP+ Module</b> | <b>SFP+ Module (10G-SR)</b>                                                            | N8104-129 |
|                    | 1 x SFP+ Module for N8104-148 and N8104-149, N8104-156                                 |           |

**NOTE:**

- Supports up to three adapters of 10Gb Converged Network Adapter and 10Gb Network Adapter. However, up to two when WS2008(x86) is installed, and up to one when RHEL 6(x86) is installed.
- Network performance may be reduced depending on the applications and memory performance when three or more 10Gb Network Adapters are installed.
- There are following limitations when using ESXi 6.0;
  - (1) When N8104-154F is selected, mix configuration of N8104-149/153 and N8104-150/151/152/145 is not supported.
  - (2) When N8104-155F is selected, mix configuration of N8104-150/151/145 and N8104-152 is not supported, up to two adapters can be selected from N8104-150/151/145, and up to one adapter of N8104-152.
  - (3) When N8104-156F is selected, up to one adapter can be selected form N8104-150/-151/-145, and N8104-152 cannot be installed.

## NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows Server 2008 supports BASP (Broadcom Advanced Server Program) or Intel PROSet teaming while Windows Server 2012 and Linux support teaming with bonding function supported by OS.

| Network Interface                            | Team                          | Operating Systems                                                                                                          |
|----------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>1GbE NIC</b><br>N8104-150/-151/-152/-154F | Up to four ports per one team | Windows Server 2008<br>Windows Server 2008 R2<br>Windows Server 2012<br>Windows Server 2012 R2<br>Red Hat Enterprise Linux |
| N8104-145                                    | Up to four ports per one team | Windows Server 2008 R2                                                                                                     |
| <b>10GbE NIC</b><br>N8104-149/156F           | Up to four ports per one team | Windows Server 2008<br>Windows Server 2008 R2<br>Windows Server 2012<br>Windows Server 2012 R2<br>Red Hat Enterprise Linux |
| <b>10GbE NIC</b><br>N8104-148                | Up to four ports per one team | Red Hat Enterprise Linux 7.1 or later                                                                                      |
| <b>10GbE NIC</b><br>N8104-153/-155F          | Up to four ports per one team | Windows Server 2012<br>Windows Server 2012 R2<br>Red Hat Enterprise Linux                                                  |

### NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for each teaming must be the same.
- When 10GbE NIC teaming and 1GbE NIC teaming are mixed, the teams must be up to five per one system.
- When using Windows Server 2008 or Windows Server 2008 R2, the teams must be up to four per one system.

## Using iSCSI

See the table below for supported network interfaces and operating system combinations.

| Categor      | Network Interface         | Operating Systems                                                                                                                                   |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1GbE</b>  | N8104-150/-151/-152/-154F | Windows Server 2008 R2, Windows Server 2012,<br>Windows Server 2012 R2, Red Hat Enterprise Linux, VMware                                            |
|              | N8104-145                 | Windows Server 2008 R2, Windows Server 2012,<br>Windows Server 2012 R2, Red Hat Enterprise Linux, VMware                                            |
| <b>10GbE</b> | N8104-149/-156F           | Windows Server 2008 R2, Windows Server 2012,<br>Windows Server 2012 R2, Red Hat Enterprise Linux, VMware                                            |
|              | N8104-148                 | Red Hat Enterprise Linux 7.1 or later                                                                                                               |
| <b>10GbE</b> | N8104-153/-155F           | Windows Server 2012, Windows Server 2012 R2 /<br>Red Hat Enterprise Linux 6.5 (x86_64) or later / Red Hat Enterprise<br>Linux 7.1 or later / VMware |

### NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

## 6.3 InfiniBand

| Category   | Product Name / Description                                                                        |                                                                                                                                   | Part Number  |
|------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|
| Controller | <b>Single Port InfiniBand Adapter</b><br>Mellanox ConnectX-3 VPI, MCX353A-FCBT, FDR, PCIe 3.0(x8) |                                                                                                                                   | N8104-146    |
|            | <b>Dual Port InfiniBand Adapter</b><br>Mellanox ConnectX-3 VPI, MCX354A-FCBT, FDR, PCIe 3.0(x8)   |                                                                                                                                   | N8104-147    |
| Cable      | <b>InfiniBand Cable 2m/FRD</b><br>Copper                                                          |                                                                                                                                   | K410-304(02) |
|            | <b>InfiniBand Cable 3m/FDR</b><br>Copper                                                          |                                                                                                                                   | K410-304(03) |
| Switch     | Unit                                                                                              | <b>InfiniBand Switch 36 ports/FDR</b><br>Mellanox MSX6036F-1SFR<br>36 ports, FDR, One power supply module included, no power cord | NE3707-061   |
|            | Power Supply                                                                                      | <b>Redundant Power Supply Unit</b><br>Power supply module for 36 ports InfiniBand switch, no power cord                           | NE3707-063   |

### NOTE:

- Up to two InfiniBand adapters can be installed into the system and two adapters should be of the same type.
- The InfiniBand adapters and other options are make-to-order products. Please consult our sales representative in regards to production lead time.

## 6.4 External Storage Controller

### 6.4.1 RAID Controller

| Category   | Product Name / Description                                                                                                                                                               | Part Number |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Controller | <b>RAID Controller (2GB, RAID0/1/5/6)</b><br>LSI MegaRAID SAS 9380-8e<br>RAID0/1/5/6/10/50/60, 2GB, Ext. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s, Flash cache protection modules included | N8103-179   |

### NOTE:

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

## Types and Number of Available RAID Controllers when Running with VMware ESXi systems

See the table below for the types and number of available RAID Controllers and SAS Controller when running with VMware ESXi systems.

The condition depends on interrupt processes managed by the operating system and insufficient interrupt resources may lead to system failure.

| Processor Type | Controller Type                                | Number of Available Controllers    | Total Number of Available Controllers |
|----------------|------------------------------------------------|------------------------------------|---------------------------------------|
| E5-2603 v3     | N8103-176 RAID Controller (1 GB, RAID 0/1)     | Up to one controller               | Up to three controllers               |
| E5-2609 v3     | N8103-177 RAID Controller (1 GB, RAID 0/1/5/6) |                                    |                                       |
| E5-2620 v3     | N8103-178 RAID Controller (2 GB,RAID 0/1/5/6)  |                                    |                                       |
| E5-2640 v3     | N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)  | Up to two controllers              |                                       |
| E5-2660 v3     |                                                |                                    |                                       |
| E5-2650L v3    | N8103-176 RAID Controller (1 GB, RAID 0/1)     | Up to one controller               | Up to two controllers                 |
| E5-2670 v3     | N8103-177 RAID Controller (1 GB, RAID 0/1/5/6) |                                    |                                       |
| E5-2690 v3     | N8103-178 RAID Controller (2 GB,RAID 0/1/5/6)  |                                    |                                       |
| E5-2695 v3     | N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)  | Up to one controller               |                                       |
| E5-2697 v3     | N8103-184 SAS Controller <sup>1</sup>          | Up to two controllers <sup>1</sup> |                                       |
| E5-2698 v3     | N8103-176 RAID Controller (1 GB, RAID 0/1)     | Up to one controller               | Up to one controller                  |
| E5-2699 v3     | N8103-177 RAID Controller (1 GB, RAID 0/1/5/6) |                                    |                                       |
|                | N8103-178 RAID Controller (2 GB,RAID 0/1/5/6)  |                                    |                                       |
|                | N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)  |                                    |                                       |
|                | N8103-184 SAS Controller <sup>1</sup>          | Up to one controller <sup>1</sup>  |                                       |

<sup>1</sup> When ESXi 5.1/5.5 is installed.

**NOTE:**

- When two external RAID controllers are installed, N8103-181 Flash backup Unit cannot be installed.

## 6.4.2 Fibre Channel / SAS Controller

| Category      | Product Name / Description                                                                                                                                                                                                        | Part Number |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Fibre Channel | <b>Fibre Channel Controller (1ch)</b><br>Emulex LightPulse LPe1250-F8 Host Bus Adapter<br>8Gb/s, Optical, PCIe 2.0 x8                                                                                                             | N8190-159   |
|               | <b>Fibre Channel Controller (2ch)</b><br>Emulex LightPulse LPe12002-M8 Host Bus Adapter<br>8Gb/s, Optical, PCIe 2.0 x8                                                                                                            | N8190-160   |
|               | <b>Fibre Channel Controller (1ch)</b><br>Emulex LightPulse LPe16000B-M6 Host Bus Adapter<br>16Gb/s, Optical, PCIe 3.0 x8                                                                                                          | N8190-157A  |
|               | <b>Fibre Channel Controller (2ch)</b><br>Emulex LightPulse LPe16002B-M6 Host Bus Adapter<br>16Gb/s, Optical, PCIe 3.0 x8                                                                                                          | N8190-158A  |
|               |                                                                                                                                                                                                                                   |             |
| SAS           | <b>SAS Controller</b><br>LSI SAS9212-4i4e Host Bus Adapter<br>6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8                                                                                                      | N8103-142   |
|               | <b>SAS Controller</b><br>LSI SAS9300-8e Host Bus Adapter<br>12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8                                                                                                                          | N8103-184   |
|               | <b>NOTE:</b><br>- There is a PCI slot limitation when VMware ESXi 5.1/5.5 is installed. Refer to <b>Types and Number of Available RAID Controllers when Running with VMware ESXi systems</b> in the previous section for details. |             |

**NOTE:**

- Up to two ports of 16Gb/s Fibre Channel Controller are supported in a single processor configuration with Xeon E5-2603v3/-2609v3.

## 6.5 Serial Port Adapter

| Product Name / Description                                     | Part Number |
|----------------------------------------------------------------|-------------|
| <b>Serial Port Adapter</b><br>Serial port fixed to PCI bracket | N8117-01A   |

**NOTE:**

- Up to one Serial Port Adapter can be installed.

## 7 Other Add-in Components

### 7.1 Power Supply

| Product Name / Description                                          | Part Number |
|---------------------------------------------------------------------|-------------|
| <b>460W Hot Plug Power Supply</b><br>1 x 460 Watt 80 PLUS® Platinum | N8181-121F  |
| <b>800W Hot Plug Power Supply</b><br>1 x 800 Watt 80 PLUS® Platinum | N8181-122F  |
| <b>800W Hot Plug Power Supply</b><br>1 x 800 Watt 80 PLUS® Titanium | N8181-118F  |

**NOTE:** 200 VAC input only supported

**NOTE:**

- The power units must be the same to configure redundancy.
- N8181-121F is not supported when 128GB DDR4-2133 LR Memory Kit (2x64GB) N8102-615F is installed.

### 7.2 Trusted Platform Module Kit

| Product Name / Description                           | Part Number |
|------------------------------------------------------|-------------|
| <b>Trusted Platform Module Kit</b><br>TPM 1.2 module | N8115-21    |

**NOTE:**

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this product.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

### 7.3 Internal Flash Memory

| Product Name / Description                                                                | Part Number |
|-------------------------------------------------------------------------------------------|-------------|
| <b>VMware ESXi support kit</b><br>Internal USB flash memory to install VMware ESXi system | N8106-009   |

**NOTE:**

- The kit does not include VMware ESXi installation media and license.

## 7.4 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

| Category | Product Name / Description                                                       | Part Number |
|----------|----------------------------------------------------------------------------------|-------------|
| External | <b>Flash FDD</b><br>USB flash emulating USB floppy disk, Native capacity 1.44 MB | N8160-96    |

**NOTE:**

- Up to one drive can be connected.

## 8 Add-on Components

### 8.1 17-inch LCD Console Drawer

| Category          |        | Product Name / Description                                                                                                                                                                                                           | Part Number  |
|-------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Drawer<br>w/ KVM  | Drawer | <b>17-inch LCD Console Drawer (8port)</b><br>17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port<br>KVM switch, 1U height                                                                                                        | N8143-106F   |
|                   | Cable  | <b>Switch Unit Connection Cable Set (USB, 1.8m)</b><br>1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin<br>USB A                                                                                                    | K410-118(1A) |
|                   |        | <b>Switch Unit Connection Cable Set (USB, 3m)</b><br>3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin<br>USB A                                                                                                        | K410-118(03) |
|                   |        | <b>Switch Unit Connection Cable Set (USB, 5m)</b><br>5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin<br>USB A                                                                                                        | K410-118(05) |
| Drawer<br>w/o KVM | Drawer | <b>17inch LCD Console Unit 1U</b><br>17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height,<br>4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m,<br>15-pin mini D-sub VGA cable 2 m                               | N8143-105F   |
|                   |        | <b>17inch LCD Console Drawer (1port)</b><br>17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad<br>with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8<br>m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m | N8143-108F   |
|                   | Keypad | <b>Keyboard Unit (JP)</b><br>JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD<br>Console Drawer (1port)                                                                                                                    | N8143-109    |
|                   |        | <b>Keyboard Unit (UK)</b><br>UK 104-keys Keyboard with 10-key, for N8143-108F 17inch<br>LCD Console Drawer (1port)                                                                                                                   | N8143-111    |

**NOTE:**

- There are two VGA connectors on R120f-1M, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.2 KVM Switch

| Category   |     | Product Name / Description                                                                                                       | Part Number  |
|------------|-----|----------------------------------------------------------------------------------------------------------------------------------|--------------|
| KVM Switch |     | <b>Server Switch Unit (8 server)</b><br>1U USB 8 port KVM switch                                                                 | N8191-14F    |
| Cable      | KVM | <b>Switch Unit Connection Cable Set (USB,1.8m)</b><br>1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin<br>USB A | K410-118(1A) |
|            |     | <b>Switch Unit Connection Cable Set (USB,3m)</b><br>3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin<br>USB A     | K410-118(03) |

|                  |                                                                       |              |
|------------------|-----------------------------------------------------------------------|--------------|
|                  | <b>Switch Unit Connection Cable Set (USB,3m)</b>                      | K410-118(05) |
|                  | 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A |              |
| <b>Cascading</b> | <b>Switch Unit Connection Cable 1.8 m</b>                             | K410-119(1A) |
|                  | 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2         |              |

**NOTE:**

- There are two VGA connectors on R120f-1M, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.3 Cable Management Arm

| Product Name / Description                         | Part Number |
|----------------------------------------------------|-------------|
| <b>Cable Management Arm 1U Kit</b><br>for R120f-1M | N8143-96    |

**NOTE:**

- The extension bracket of inner rail must be attached when installing the Cable Management Arm.

### 8.4 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to [Server Management](#) for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

| Product Name / Description                                                                                                     | Part Number |
|--------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Remote KVM and Media License Kit</b>                                                                                        | N8115-04    |
| License for one server.                                                                                                        |             |
| Remote KVM and remote media are enabled regardless of OS status.                                                               |             |
| Remote KVM:                                                                                                                    |             |
| - Displays a graphics console on the web browser of the remote terminal (PC/server).                                           |             |
| - Controls keyboard and mouse via the remote terminals' web browser                                                            |             |
| Remote media:                                                                                                                  |             |
| Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. |             |
| <b>NOTE:</b> Remote KVM and remote media features are not available for virtual machines.                                      |             |

## References

### Boot Mode Setting

The server supports Legacy mode and UEFI mode (default) as an OS Boot Mode. See the table below for the Boot Mode and X2APIC setting for each Operating System. As the default settings at the factory, UEFI mode is set as OS Boot mode and X2APIC is enabled. Refer to the User's Guide and change the settings before installing an Operating System requiring Legacy Mode.

| Operating System                   | Supported Boot Mode | Supported X2APIC Setting |
|------------------------------------|---------------------|--------------------------|
| Windows Server 2008(x86)           | Legacy              | Disabled                 |
| Windows Server 2008 R2 (x64)       | Legacy              | Disabled                 |
| Windows Server 2012                | UEFI                | Enabled                  |
| Windows Server 2012 R2             | UEFI                | Enabled                  |
| Red Hat Enterprise Linux 6         | Legacy              | Disabled                 |
| Red Hat Enterprise Linux 6(x86_64) | UEFI                | Enabled                  |
| Red Hat Enterprise Linux 7         | UEFI                | Enabled                  |
| VMware ESXi 5.1 Update2            | Legacy              | Disabled                 |
| VMware ESXi 5.5 Update2            | Legacy              | Disabled                 |
| VMware ESXi 6.0                    | Legacy              | Disabled                 |

## Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

|                                 |                                                                                   | Standard             | With Remote KVM and Media License kit |
|---------------------------------|-----------------------------------------------------------------------------------|----------------------|---------------------------------------|
| <b>Hardware monitoring</b>      | Temperature/voltage/power/RAID/standard LAN/fan /degeneration (memory/hard drive) | ✓ <sup>5</sup>       | ✓ <sup>5</sup>                        |
|                                 | Hardware configuration information collection                                     | ✓                    | ✓                                     |
|                                 | Hardware event log collection                                                     | ✓                    | ✓                                     |
| <b>Boot monitoring</b>          | BIOS/POST stall, Booting, OS stall, shutdown                                      | ✓ <sup>1</sup>       | ✓ <sup>1</sup>                        |
| <b>Alerting</b>                 | HW error, Boot error , and OS panic (by SNMP, E-Mail)                             | ✓                    | ✓                                     |
| <b>Remote KVM (via LAN)</b>     | POST/BIOS setup, ROM utility                                                      | ✓ <sup>2</sup>       | ✓                                     |
|                                 | Panic screen, Boot screen                                                         | ✓ <sup>2, 3, 4</sup> | ✓                                     |
|                                 | CUI-based screen (OS console)                                                     | ✓ <sup>2, 4</sup>    | ✓                                     |
|                                 | GUI-based screen (OS console)                                                     | -                    | ✓                                     |
|                                 | Remote console recording function                                                 | -                    | ✓                                     |
|                                 | Video recording                                                                   | -                    | ✓                                     |
| <b>Remote control (via LAN)</b> | Remote reset/power on-off/ dump                                                   | ✓                    | ✓                                     |
|                                 | Remote power capping                                                              | ✓                    | ✓                                     |
|                                 | BIOS/BMC FW update                                                                | ✓                    | ✓                                     |
|                                 | Remote BIOS setup(partial configuration only)                                     | ✓                    | ✓                                     |
|                                 | OS shutdown                                                                       | ✓ <sup>1</sup>       | ✓ <sup>1</sup>                        |
|                                 | Remote media (CD/DVD/FD/USB)                                                      | -                    | ✓                                     |
|                                 | CLP (Command Line Protocol) (DMTF compliant)                                      | ✓                    | ✓                                     |
|                                 | Remote control via Web browser (multi user login at the same time)                | ✓                    | ✓                                     |
| <b>Maintenance</b>              | Scheduling (without UPS)                                                          | ✓ <sup>1</sup>       | ✓ <sup>1</sup>                        |
|                                 | EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)             | ✓                    | ✓                                     |
| <b>Others</b>                   | Set automatic IP address via DNS/DHCP                                             | ✓                    | ✓                                     |
|                                 | LDAP/Active Directory verification/user control                                   | ✓                    | ✓                                     |
|                                 | Clock synchronization of main unit and the RTC                                    | ✓                    | ✓                                     |
|                                 | Access log collection                                                             | ✓                    | ✓                                     |
|                                 | IPMI                                                                              | 2.0                  | 2.0                                   |
|                                 | IPv6(Web console/CLP only)                                                        | ✓                    | ✓                                     |

<sup>1</sup> The feature is not supported on VMware ESXi systems.

<sup>2</sup> The optional serial port is not available for the feature.

<sup>3</sup> Monitoring boot screens is not supported on VMware systems.

<sup>4</sup> In VMware systems, only the direct console user interface is supported.

<sup>5</sup> BMC firmware version should be 02.11 or later to monitor N8104-156 Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card.

## OS Support Matrix for PCI Cards and Embedded Controllers

| Part number | Product Name                                      | WS 2012 R2 | WS 2012 | WS 2008 R2 | WS 2008 | RHEL 7 | RHEL 6 | RHEL 6 x64 | ESXi 6.0 | ESXi 5.5 | ESXi 5.1 |
|-------------|---------------------------------------------------|------------|---------|------------|---------|--------|--------|------------|----------|----------|----------|
| -           | Embedded SATA non-RAID Controller                 | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-176   | RAID Controller (1 GB, RAID 0/1)                  | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-177   | RAID Controller (1 GB, RAID 0/1/5/6)              | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-178   | RAID Controller (2 GB,RAID 0/1/5/6)               | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-179   | RAID Controller (2 GB,RAID 0/1/5/6)               | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-142   | SAS Controller                                    | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8103-184   | SAS Controller                                    | ✓          | ✓       | -          | -       | ✓      | -      | ✓          | ✓        | ✓        | -        |
| N8190-159   | Fibre Channel Controller                          | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8190-160   | Fibre Channel Controller (2ch)                    | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8190-157A  | Fibre Channel Controller                          | ✓          | ✓       | ✓          | -       | ✓      | -      | ✓          | ✓        | ✓        | -        |
| N8190-158A  | Fibre Channel Controller (2ch)                    | ✓          | ✓       | ✓          | -       | ✓      | -      | ✓          | ✓        | ✓        | -        |
| N8104-154F  | Quad Port 1000BASE-T LOM Card                     | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-150   | 1000BASE-T Adapter                                | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-151   | Dual Port 1000BASE-T Adapter                      | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-145   | Dual Port 1000BASE-T Adapter                      | -          | -       | ✓          | -       | ✓      | ✓      | ✓          | -        | ✓        | ✓        |
| N8104-152   | Quad Port 1000BASE-T Adapter                      | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-155F  | Dual Port 10GBASE-T LOM Card                      | ✓          | ✓       | -          | -       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-153   | Dual Port 10GBASE-T Adapter                       | ✓          | ✓       | -          | -       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-156F  | Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-149   | 10GBASE SFP+ Adapter (SFP+/2ch)                   | ✓          | ✓       | ✓          | ✓       | ✓      | ✓      | ✓          | ✓        | ✓        | ✓        |
| N8104-148   | Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)         | -          | -       | -          | -       | ✓      | ✓      | ✓          | -        | -        | -        |
| N8104-146   | Single Port InfiniBand Adapter                    | ✓          | ✓       | -          | -       | ✓      | -      | ✓          | -        | -        | -        |
| N8104-147   | Dual Port InfiniBand Adapter                      | ✓          | ✓       | -          | -       | ✓      | -      | ✓          | -        | -        | -        |
| N8118-01    | PCIe SSD Adapter 365GB                            | ✓          | ✓       | -          | -       | -      | -      | -          | -        | -        | -        |

## Supported PCI Cards and Installable Slots

### Standard Riser Card

| Priority | Part Number | Product Name                                      | Slots |     |     |     |
|----------|-------------|---------------------------------------------------|-------|-----|-----|-----|
|          |             |                                                   | #1A   | #1B | #1C | #1D |
| (1)      | N8104-155F  | Dual Port 10GBASE-T LOM Card                      | -     | (1) | -   | -   |
| (2)      | N8104-156F  | Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card | -     | (1) | -   | -   |
| (3)      | N8104-154F  | Quad Port 1000BASE-T LOM Card                     | -     | (1) | -   | -   |
| (4)      | N8103-176   | RAID Controller (1 GB, RAID 0/1)                  | (1)   | -   | -   | -   |
| (5)      | N8103-177   | RAID Controller (1 GB, RAID 0/1/5/6)              | (1)   | -   | -   | -   |
| (6)      | N8103-178   | RAID Controller (2 GB, RAID 0/1/5/6)              | (1)   | -   | -   | -   |
| (7)      | N8103-179   | RAID Controller (2 GB, RAID 0/1/5/6)              | -     | -   | (1) | (2) |
| (8)      | N8118-01    | PCIe SSD Adapter 365GB                            | -     | -   | (1) | (2) |
| (9)      | N8190-158A  | Fibre Channel Controller (2ch)                    | -     | -   | (1) | (2) |
| (10)     | N8190-157A  | Fibre Channel Controller                          | -     | -   | (1) | (2) |
| (11)     | N8104-147   | Dual Port InfiniBand Adapter                      | -     | -   | (1) | (2) |
| (12)     | N8104-146   | Single Port InfiniBand Adapter                    | -     | -   | (1) | (2) |
| (13)     | N8103-184   | SAS Controller                                    | -     | -   | (1) | (2) |
| (14)     | N8104-153   | Dual Port 10GBASE-T Adapter                       | -     | -   | (1) | (2) |
| (15)     | N8104-149   | 10GBASE SFP+ Adapter (SFP+/2ch)                   | -     | -   | (1) | (2) |
| (16)     | N8104-148   | Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)         | -     | -   | (1) | (2) |
| (17)     | N8190-160   | Fibre Channel Controller (2ch)                    | -     | -   | (1) | (2) |
| (18)     | N8190-159   | Fibre Channel Controller                          | -     | -   | (1) | (2) |
| (19)     | N8103-142   | SAS Controller                                    | -     | -   | (1) | (2) |
| (20)     | N8104-152   | Quad Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (21)     | N8104-145   | Dual Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (22)     | N8104-151   | Dual Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (23)     | N8104-150   | 1000BASE-T Adapter                                | -     | -   | (1) | (2) |
| (24)     | N8117-01A   | Serial Port Adapter                               | -     | -   | (1) | (2) |

#### NOTE:

- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (4) in the slot #1A, N8104-153 (14) in the slot #1C and N8190-160 (17) in the slot #1D when you install those cards.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.1

<https://www.vmware.com/pdf/vsphere5/r51/vsphere-51-configuration-maximums.pdf>

VMware ESXi5.5

<https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf>

VMware ESXi6.0

<https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf>

## N8116-33 PCIe x16 Riser Card Kit

| Priority | Part Number | Product Name                                      | Slots |     |     |     |
|----------|-------------|---------------------------------------------------|-------|-----|-----|-----|
|          |             |                                                   | #1A   | #1B | #1C | #1D |
| (1)      | N8104-155F  | Dual Port 10GBASE-T LOM Card                      | -     | (1) | -   | -   |
| (2)      | N8104-156F  | Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card | -     | (1) | -   | -   |
| (3)      | N8104-154F  | Quad Port 1000BASE-T LOM Card                     | -     | (1) | -   | -   |
| (4)      | N8103-176   | RAID Controller (1 GB, RAID 0/1)                  | (1)   | -   | -   | -   |
| (5)      | N8103-177   | RAID Controller (1 GB, RAID 0/1/5/6)              | (1)   | -   | -   | -   |
| (6)      | N8103-178   | RAID Controller (2 GB, RAID 0/1/5/6)              | (1)   | -   | -   | -   |
| (7)      | N8103-179   | RAID Controller (2 GB, RAID 0/1/5/6)              | -     | -   | (1) | (2) |
| (8)      | N8118-01    | PCIe SSD Adapter 365GB                            | -     | -   | (1) | (2) |
| (9)      | N8190-158A  | Fibre Channel Controller (2ch)                    | -     | -   | (1) | (2) |
| (10)     | N8190-157A  | Fibre Channel Controller                          | -     | -   | (1) | (2) |
| (11)     | N8104-147   | Dual Port InfiniBand Adapter                      | -     | -   | (1) | (2) |
| (12)     | N8104-146   | Single Port InfiniBand Adapter                    | -     | -   | (1) | (2) |
| (13)     | N8103-184   | SAS Controller                                    | -     | -   | (1) | (2) |
| (14)     | N8104-153   | Dual Port 10GBASE-T Adapter                       | -     | -   | (1) | (2) |
| (15)     | N8104-149   | 10GBASE SFP+ Adapter (SFP+/2ch)                   | -     | -   | (1) | (2) |
| (16)     | N8104-148   | Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)         | -     | -   | (1) | (2) |
| (17)     | N8190-160   | Fibre Channel Controller (2ch)                    | -     | -   | (1) | (2) |
| (18)     | N8190-159   | Fibre Channel Controller                          | -     | -   | (1) | (2) |
| (19)     | N8103-142   | SAS Controller                                    | -     | -   | (1) | (2) |
| (20)     | N8104-152   | Quad Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (21)     | N8104-145   | Dual Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (22)     | N8104-151   | Dual Port 1000BASE-T Adapter                      | -     | -   | (1) | (2) |
| (23)     | N8104-150   | 1000BASE-T Adapter                                | -     | -   | (1) | (2) |
| (24)     | N8117-01A   | Serial Port Adapter                               | -     | -   | (1) | (2) |

**NOTE:**

- The slot #1C and #1D are available in a dual-processor configuration.
- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (4) in the slot #1A, N8104-153 (14) in the slot #1C and N8190-160 (17) in the slot #1D when you install those cards.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.1

<https://www.vmware.com/pdf/vsphere5/r51/vsphere-51-configuration-maximums.pdf>

VMware ESXi5.5

<https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf>

VMware ESXi6.0

<https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf>

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

## Revision History

| Revision | Date              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.0      | October 23, 2015  | <b>New products added:</b><br>128GB DDR4-2133 LR Memory Kit (2x64GB) / N8102-615F<br>External DVD Super MULTI Drive / N8160-97F<br><b>Discontinued product deleted:</b><br>External DVD-ROM drive / N8160-91                                                                                                                                                                                                                                                                                                               |
| 8.0      | July 16, 2015     | <b>Discontinued product deleted:</b><br>100GB Hot Plug 2.5-inch SATA SSD N8150-724<br>PCIe SSD Adapter 365GB N8118-01<br><b>Others:</b><br>Added RHEL 7 to the list of operating system supported<br>Changed the number of logical processors and maximum memory size supported by Red Hat Enterprise Linux 6 (x86_64)<br>2.5-inch SATA SSD(MLC) is supported on VMware ESXi<br>Changed N8104-148 Linux support conditions (NIC teaming and iSCSI)<br>Added URL links to VMware documents for the configuration limitation |
| 7.0      | June 25, 2015     | <b>Discontinued product deleted:</b><br>4KB sector drives other than N8150-490 and N8150-521<br><b>Others:</b><br>Added a note for 4KB sector drives                                                                                                                                                                                                                                                                                                                                                                       |
| 6.0      | May 29, 2015      | <b>Others:</b><br>Added BIS in the Regulatory and Safety list<br>SAS Controller N8103-184 supports ESXi 5.5<br>Added PCI slot limitation for VMware ESXi 5.1/5.5<br>Corrected description of N8104-156F/N8104-149<br>Added note for N8104-145 Dual Port 1000BASE-T Adapter                                                                                                                                                                                                                                                 |
| 5.0      | April 17, 2015    | <b>New products added:</b><br>1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-520<br>2TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-521<br><b>Others:</b><br>Added ESXi 6 to the list of operating system supported                                                                                                                                                                                                                                                                                                               |
| 4.1      | March 25, 2015    | <b>Others:</b><br>Added note for RAID Controller Configuration (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4.0      | February 18, 2015 | <b>New products added:</b><br>VMware ESXi support kit / N8106-009<br><b>Others:</b><br>Added note to configure with VMware Systems<br>Updated Supported PCI Cards and Installable Slots matrix to indicate the population priority of PCI card                                                                                                                                                                                                                                                                             |
| 3.0      | January 28, 2015  | <b>New products added:</b><br>SAS Controller / N8103-184<br><b>Part number changed:</b><br>Flash FDD / N8160-96<br>17-inch LCD Console Drawer (1port) / N8143-108F<br>Keyboard Unit (JP) / N8143-109<br>Keyboard Unit (UK) / N8143-111<br><b>Others:</b><br>Added CCC and RCM in the Regulatory and Safety list<br>Corrected a note for RAID controllers                                                                                                                                                                   |
| 2.0      | November 17, 2014 | <b>Others:</b><br>Added KC in the Regulatory and Safety list<br>512B sector SAS HDDs supported on UEFI Boot OS<br>250GB SATA HDD supported on UEFI Boot OS<br>N8103-142 SAS controller supported on ESXi<br>N8104-153 Dual Port 10GBASE-T Adapter supported on Windows/ESXi<br>N8104-155F Dual Port 10GBASE-T Adapter supported on Windows<br>Notes for NIC Teaming feature changed                                                                                                                                        |

|     |                    |                                                                                                                       |
|-----|--------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1.1 | October 16, 2014   | <b>Others:</b><br>Added BSMI and UL(Mexico) in the Regulatory and Safety list.<br>Support for VMware ESXi 5.1 and 5.5 |
| 1.0 | September 17, 2014 | Initial release                                                                                                       |