The purpose of this document is to provide an overview of the memory configurations for the HP Z820 Workstation and to provide recommendations to optimize performance.

**Supported memory modules**

Types of memory supported on a HP Z820 are:
- 2 GB and 4 GB PC3-14900E 1866MHz DDR3 Unbuffered ECC DIMMs
- 4 GB, 8 GB and 16 GB PC3-14900R 1866MHz DDR3 Registered DIMMs
- 32 GB PC3-14900L 1866MHz DDR3 LR DIMMs
- 1.35V and 1.5V DIMMs are supported, but the system will operate the DIMMs, safely, at 1.5V only.
- 2 Gb and 4 Gb based DIMMs are supported.

See the Memory Technology White Paper for additional technical information.

**Platform capabilities**

**Maximum capacity**
- Single processor: 256 GB
- Dual processors: 512 GB

**Total of 16 memory sockets**
- 8 memory sockets available per CPU
- 4 channels per processor and 2 sockets per channel

**Speed**
- 1866MHz, 1600MHz and 1333MHz DIMMs are supported in this platform
- Memory will operate at the speed of the slowest rated installed processor or DIMM

For any of the black and white pair of memory connector, if two LR DIMMs are installed, all the memory in the system will run at 1600MHz

Unbuffered, Registered and LR DIMMs cannot be mixed in a system.

Dynamic power saving is enabled.

NUMA and Non-NUMA modes are supported and user configurable.

**Memory features**

**ECC is supported on all of our supported DIMMs.**
- Single-bit errors are automatically corrected.
- Multi-bit errors are detected and will cause the system to immediately reboot and halt with an F1 prompt error message.

Non-ECC memory does not detect or correct single-bit or multi-bit errors which can cause instability, or corruption of data, in the platform. See the Memory Technology White Paper for additional technical information.

Command and Address parity is supported with Registered and LR DIMMs.

**Optimize performance**

Generally, maximum memory performance is achieved by evenly distributing total desired memory capacity across all operational channels. Proper individual DIMM capacity selection is essential to maximizing performance. On the second CPU, installing the same amount of memory as the first CPU will optimize performance. Refer to the Optimal Memory Configuration tables on the next page for more information.
**Figure 1.1 Optimal memory configurations for single processors**
(Note: The following tables do not include all available factory installed configurations)

<table>
<thead>
<tr>
<th>Total Capacity</th>
<th>DIMM 1</th>
<th>DIMM 2</th>
<th>DIMM 3</th>
<th>DIMM 4</th>
<th>DIMM 5</th>
<th>DIMM 6</th>
<th>DIMM 7</th>
<th>DIMM 8</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 GB*</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fair</td>
</tr>
<tr>
<td>4 GB*</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>6 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Better</td>
</tr>
<tr>
<td>8 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>12 GB~</td>
<td>2 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Better</td>
</tr>
<tr>
<td>16 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>24 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>32 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>48 GB</td>
<td>4 GB</td>
<td>8 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>64 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>80 GB~</td>
<td>16 GB</td>
<td>4 GB</td>
<td>16 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>16 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>96 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>16 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>128 GB</td>
<td>16 GB</td>
<td>32 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td>16 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>256 GB†‡</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td></td>
<td></td>
<td>Better</td>
</tr>
</tbody>
</table>

* For 32-bit operating systems, there is a memory limit of 4 GB.
~ Although supported, these configurations are not factory installed at this time.
† The speed of the memory will be 1600MHz.
‡ Windows 7 only supports up to 192GB of memory.

**Figure 1.2 Optimal memory configurations for dual processors**
(Note: The following tables do not include all available factory installed configurations)

<table>
<thead>
<tr>
<th>Total Capacity</th>
<th>DIMM 1</th>
<th>DIMM 2</th>
<th>DIMM 3</th>
<th>DIMM 4</th>
<th>DIMM 5</th>
<th>DIMM 6</th>
<th>DIMM 7</th>
<th>DIMM 8</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 GB*</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fair</td>
</tr>
<tr>
<td>8 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>16 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>32 GB~</td>
<td>2 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td></td>
<td></td>
<td>Better</td>
</tr>
<tr>
<td>32 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>48 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>64 GB~</td>
<td>4 GB</td>
<td>8 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td>4 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>96 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>128 GB</td>
<td>16 GB</td>
<td>4 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td>8 GB</td>
<td>16 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>192 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td>16 GB</td>
<td>8 GB</td>
<td></td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>256 GB†‡</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td></td>
<td></td>
<td>Better</td>
</tr>
<tr>
<td>512 GB†‡</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td>32 GB</td>
<td></td>
<td></td>
<td>Better</td>
</tr>
</tbody>
</table>
Loading rules

- Each channel includes two DIMM sockets; black and white connector pairs represent a channel. Load all black slots first and then load the white slots.
- Load the memory modules in order of size, starting with the largest module and finishing with the smallest module.
- For a single processor configuration, the DIMMs should be loaded first in the black sockets and then in the white sockets. The DIMMs should be loaded starting with the socket furthest from the CPU, with the first DIMM loaded in the bottom most socket and alternating sides of the CPU.
- For a dual processor configuration, follow the loading order above, but alternate between the two processors.
- See diagram below for loading order

Figure 2. Load order for single and dual CPU configurations.

1 Each processor supports up to 4 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

Additional Resources
hp.com/go/whitepapers
hp.com/support/Z820_manuals

© Copyright 2012-2013 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.