HP Z820 memory configurations and optimization

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

Supported memory modules[1]

Types of memory supported on a HP Z820 are:

- 2 GB and 4 GB PC3-12800E 1600MHz DDR3 Unbuffered ECC DIMMs
- 4 GB, 8 GB and 16 GB PC3-12800R 1600MHz DDR3 Registered DIMMs
- 32 GB PC3-10600L 1333MHz 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

- 1600MHz, 1333MHz and 1066MHz DIMMs are supported in this platform
- Memory will operate at the speed of the slowest rated installed processor or DIMM

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. Refer to the Optimal Memory Configuration tables on the next page for more information.
HP recommends Windows® 7.

Figure 1

Optimal memory configurations for single processors

(Note: The following tables do not include all available factory installed configurations)

Total Capacity	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	Rating
2 GB*	2 GB								Fair
4 GB*	2 GB							2 GB	Good
6 GB~	2 GB		2 GB					2 GB	Better
8 GB	2 GB 4 GB		2 GB			2 GB		2 GB 4 GB	Best Good
12 GB~	2 GB 4 GB	2 GB	2 GB 2 GB			2 GB 2 GB	2 GB	2 GB 4 GB	Better
16 GB	2 GB 4 GB	2 GB	2 GB 4 GB	2 GB	2 GB	2 GB 4 GB	2 GB	2 GB 4 GB	Best
24 GB	4 GB	2 GB	4 GB	2 GB	2 GB	4 GB	2 GB	4 GB	Best
32 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB	Best
48 GB	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	Best
64 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	Best
80 GB~	16 GB	4 GB	16 GB	4 GB	4 GB	16 GB	4 GB	16 GB	Best
96 GB~	16 GB	8 GB	16 GB	8 GB	8 GB	16 GB	8 GB	16 GB	Best
128 GB 128 GB†	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	Best Better
256 GB†‡	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	Better

Optimal memory configurations for dual processors

Total Capacity	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	Rating
4 GB*	2 GB								2 GB								Fair
8 GB	2 GB							2 GB	2 GB							2 GB	Good
16 GB 16 GB~	2 GB 4 GB		2 GB			2 GB		2 GB 4 GB	2 GB 4 GB		2 GB			2 GB		2 GB 4 GB	Best Good
32 GB~ 32 GB 32 GB	2 GB 4 GB 8 GB	2 GB	2 GB 4 GB	2 GB	2 GB	2 GB 4 GB	2 GB	2 GB 4 GB 8 GB	2 GB 4 GB 8 GB	2 GB	2 GB 4 GB	2 GB	2 GB	2 GB 4 GB	2 GB	2 GB 4 GB 8 GB	Best Best Good
48 GB	4 GB	2 GB	4 GB	2 GB	2 GB	4 GB	2 GB	4 GB	4 GB	2 GB	4 GB	2 GB	2 GB	4 GB	2 GB	4 GB	Best
64 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB	Best
96 GB	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	Best
128 GB	8 GB 16 GB	8 GB	8 GB 16 GB	8 GB	8 GB	8 GB 16 GB	8 GB	8 GB 16 GB	8 GB 16 GB	8 GB	8 GB 16 GB	8 GB	8 GB	8 GB 16 GB	8 GB	8 GB 16 GB	Best
192 GB	16 GB	8 GB	16 GB	8 GB	8 GB	16 GB	8 GB	16 GB	16 GB	8 GB	16 GB	8 GB	8 GB	16 GB	8 GB	16 GB	Best
256 GB‡ 256 GB†‡	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	Best Better
512 GB†‡	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	Better

* 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 1333 MHz.
‡ Windows 7 only supports up to 192GB of memory.

HP recommends Windows® 7.

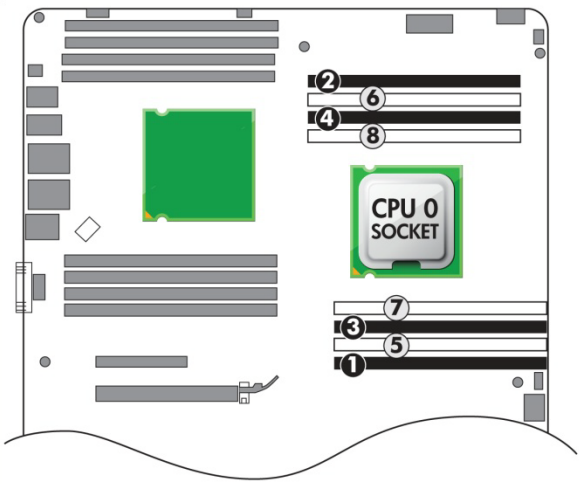
Loading rules

- 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

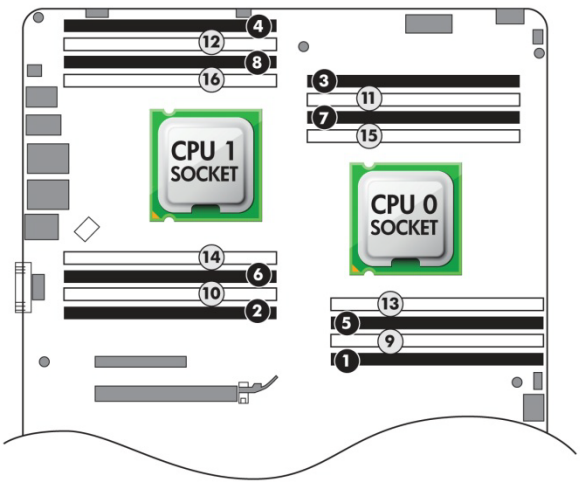
Figure 2

Loading order

Load order for single CPU configuration.



Load order for dual CPU configuration.



Additional resources

hp.com/go/whitepapers

hp.com/support/Z820_manuals

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.

4AA3-9559ENW, September 2012