Why buy HP Memory

The purpose of this document is to help HP Workstation customers decide whether to populate their HP products with HP memory or with 3rd party memory. 3rd party memory is often less expensive than HP memory. Should customers pay extra for HP memory and if so what are the benefits?
It is HP's desire that our customers understand some facts of memory technology and make the most informed decision possible based on their business needs.

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Introduction

Much memory, at this time, is sold in the form of memory modules referred to as DIMMs, which stands for dual in-line memory modules. These DIMMs consist of a small printed circuit board with RAM and various other components attached. Many people would describe a DIMM as a commodity, but it is a very complex commodity.

The idea that DIMMs are a commodity sometimes leads prospective buyers to believe that all DIMMs with the same "speed rating", say PC4-2400, have the same performance in a system. (One can decode PC4-2400 as an indication that the DIMM uses DDR4 RAM, can move data at a peak rate of 2.4 GBytes/second, and may be clocked at up to 1200 MHz.) There are many other parameters besides this simple speed rating that influence overall application performance and whether or not the DIMM actually functions correctly.

In addition to the complexity of the DIMMs is the complexity of the system. There are interactions involving the layout of the system board, the sockets for the DIMMs, the design of the system cooling, the system power budget, and the design and set-up of the memory controller. These complex interactions may result in poor performance or unreliable system operation if the system is not considered as a whole.

The RAM components used in DIMMs have wide variations in power consumption. Some RAM uses more power than others. This, in conjunction with a system's cooling solution, can cause problems. A system designed to provide adequate cooling without outrageous acoustic noise may not work properly with higher-power RAM. Quite simply, RAM that is too hot "forgets" information resulting in possible data corruption or system shutdown. Even if the cooling is adequate the extra electrical load may exceed design limits for the workstation resulting in system shut-down and consequent data loss.

DIMM Printed Circuit Assembly (PCA) Design and Manufacture

Just as there are variations between the RAM components, there is also variation between the Printed Circuit Assemblies (PCAs) across the different manufacturers. Common PCA issues are listed below.

- Poor trace impedance matching
- Inadequate or poorly placed decoupling capacitance
- Inadequate edge connector plating thickness or improper plating materials
- Poor layout design in the area of the edge connector
- RAM package selected lacks adequate mechanical support
- Solder problems including incompatible plating and solder, cold or cracked solder joints
- Improperly programmed SPD ROM
- RAM component quality
- Clock buffer and timing tuning (registered DIMMs)
- Register component quality (registered DIMMSs)
- Conductive or corrosive contamination left on PCA
- Inadequate test

Any of the above items, alone or in combination with others, will affect the stability and reliability of the system they are installed in.

The serial presence detect ROM, or SPD

DIMMs have a small electrically erase-able programmable ROM on them. The contents of this ROM describe the manufacturer, amount of RAM on the module, number of RAM components on the module, organization of the RAM for addressing purposes, maximum clock rate, latency requirements between operations, and more. System code in the workstation reads information from the SPD on each DIMM installed in the system and sets up memory controller hardware to operate in a manner compatible with that information. Test and verification needs to occur to make sure that the system code is compatible with and operates properly with the contents of the SPD's on the DIMM's that are installed in the system. There are dozens of registers that must be set up properly by system code in the memory controller hardware. Whether or not that is done correctly depends on interoperability between SPD contents and the system code. If these registers are not set up properly and compatibly with the DIMMs installed in the system there may be system stability or data corruption problems.

What do you get with HP DIMMs?

• Tested in your specific workstation model

• Tested at high temperatures

• Tested at cold temperatures

• Tested at nominal temperatures

• Higher-than-nominal voltage

• Lower-than-nominal voltage

• Nominal voltage

• Higher-than-nominal frequency

DIMMs that have been sample-tested as follows:

• Lower-than-nominal frequency

• Nominal frequency

• Verified for operating temperature in your specific workstation model running various application work-loads

• Verified that it will not overload system power capability, causing shut-downs

HP-validated memory is tested so that it does not get too hot and forget your data. HP-validated memory is tested so that it does not cause the system to shut-down due to power overload. The SPD contents and the RAM, on HP validated memory, work properly in concert with system code to properly set up the memory controller hardware. In short, HP exhaustively tested the memory to allow for it to work well in your specific model of workstation.

Other advantages to HP-validated memory

Price VS Cost
Many buyers look only at purchase price. An informed customer will look at total cost and not just the purchase price.

3rd party products carry some additional costs. For example, doing a separate purchase order to the 3rd party will cost somewhere around $125 just to process the separate purchase order. Here are a few more costs to consider:

• Inventory and spares stocking

• Shipping

• Secure storage

• Installation (and breakage)

• Left-over inventory

• Consequential damage to systems

• System downtime

• Debugging intermittent failures

• Purchasing the wrong parts

• Out-of-scope field service fees

• Performance less than should be expected

If you order your HP Workstation configured with the RAM you need, it will be installed at the HP factory and tested before being shipped to you. You fill out only one purchase order, no need to open the machine up yourself, etc.

HP Service and Warranty
If it is determined that the failure is caused by a 3rd party part (non-hp qualified/supported), the customer would be asked on the phone to have the part removed and re-run the diagnostics. If the failure goes away with the 3rd party part removed, it will be left to the customer to contact 3rd party vendor for support. If at any time it is found that a 3rd party part damages HP components or systems, the cost of repair including HP damaged parts, labor and travel would not be covered under HP standard warranty, but would be the responsibility of the customer.

Summary

Below is a chart which summarizes various factors and costs a customer should consider when selecting memory. HP cares about product quality and end user productivity. Our memory strategy reflects our values. We believe that this strategy is what best helps our customers achieve their business goals and gives them a competitive advantage.

Memory Characteristic	HP	3rd Party
Purchase, Installation, and Service		
Cost of extra PO to buy memory	$0	
Cost of shipping and reciving memory	$0	
Installation done by	HP	
Cost of installation	$0	
Consequential damage liability	$0	
HP Service Charge if memory at fault	$0	
Replacement parts stockerd in field?	Yes	
Cost to re-installed memory?	$0	
Cost of extra down time?	N/A	
The right stuff?	Yes	
Quality, Performance, and Reliability		
Performance	As Expected	
Burned in?	Yes	
Proper cooling?	Yes	
Enough power in system?	Yes	

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