as can be seen in Figure 3, has four processors along its pipeline: the local task processor, the database processor, the graphics engine, and the logical I/O processor. The processors are connected by a proprietary 32-bit bus.

The local task processor is based on the Intel 80186 16-bit microprocessor. It performs two types of functions: internal communications and local task execution. It handles communications to the host computer and among the various processors through RS-232 serial ports, Centronics-type parallel ports, floppy disks, and a Multibus. (An optional Ethernet interface, handled by a separate communications processor, allows local area networking.)

The local tasks can be implemented by users with Megatek's Local Task Language. Putting local tasks on the 80186 offloads them from the host computer, speeding up processing accordingly. Up to eight concurrent tasks can be run on the local task processor. These tasks may embrace the control of linkage to the host computer, the creation of menus, or the triggering of criteria-based actions.

The database processor is built on an Intel 80286 16-bit microprocessor. This unit views memory as a collection of segments of data and executable code. Each segment can be viewed as the physical embodiment of a software module—hardware organization follows software organization. Thus, the 80286 is well suited to carry out some of the sequence of software processes found along the graphics pipeline. Because the functions needed to support concurrency are in the chip hardware, tasks can be switched from one to another in only 21 microseconds, far faster than the several hundred milliseconds often taken to switch tasks by software means.

The database processor is associated with a 512K-byte local memory, expandable to 4.5M bytes. This memory contains a representation of three-dimensional coordinates together with object attributes, such as topological connections, texture, or depth. The object is maintained in a hierarchical data structure—lists or arrays. With so much local capability, objects can be created or modified locally without having to refer work to the host. Also, the view of the object can be changed locally.

The 64-bit graphics engine is custom designed. It takes data from the local database structure and converts it to vectors for stroke display or scan converts vector data to pixel locations for raster-scan output.

The logical I/O processor completes the pipeline and is, again, based on the Intel 80186 16-bit microprocessor.

A new feature included in the Merlin 9200 is the anti-aliasing hardware, which uses a technique Megatek calls "pixel phasing." While the actual raster resolution (and the corresponding frame-buffer size) is 768 x 576, the electron beam can be "micro-positioned" over a 3072 x 2304 grid in such a way that the jaggies can be smoothed out.

Now in "beta" site testing, the Merlin 9200 appears to approach real-time performance for objects of considerable complexity. On 3-D tasks, it is expected to be capable of processing 100,000 16-bit vectors in one second. The price ranges from $35,000 to $50,000, depending on the options selected.

References

