
The Vertical Retrace Manager

Originally, the Vertical Retrace Manager handled the queuing and execution of tasks scheduled to run during VBL interrupts, which occurred each time the electron beam in the video screen returned from the lower-right to the upper-left corner of the built-in screen. The VBL interrupts occurred at a known frequency (once every sixtieth of a second), and an application could use the **VInstall** function to schedule execution of a task once or continually after some specified number of VBL interrupts. In this way, your application could schedule periodic tasks even before the **Time Manager** existed.

Once it became possible to use external monitors with certain Macintosh computers, the Vertical Retrace Manager was changed to support different refresh rates and multiple queues. New slot-based VBL interrupts were added—one for each attached video device, with a rate determined by that video device. The older once-a-tick VBL interrupts were retained, however, for compatibility reasons. So an application can still schedule routines for execution during a slot-generated VBL interrupt (using the slot **VInstall** function) or during a system-generated VBL interrupt (using the original **VInstall**). In either case, the indicated routine runs at the future time specified in the call.

You can use either the **Time Manager** or the Vertical Retrace Manager to schedule future or periodic tasks. The main difference between the two scheduling methods is the precision with which those tasks can be scheduled. You can call system-generated VBL tasks with a minimum period of 1 tick (one-sixtieth of a second), which is approximately 16 milliseconds. You can call slot-generated VBL tasks with a minimum period that depends on the refresh rate of the particular video device associated with that slot, which is usually close to 1 tick. The extended

Time Manager routines provide much finer resolution, up to 20 microseconds. Hence, the resolution of the **Time Manager** is about 1000 times greater than that of the Vertical Retrace Manager. So in cases where very high resolution is important, you should use the **Time Manager** routines instead of the Vertical Retrace Manager routines.

Unlike the **Time Manager**, the Vertical Retrace Manager is not an absolute time mechanism. Its operations are always relative to the VBL interrupt, which may be disabled (for instance, during disk access). As a result, you should use the **Time Manager** in cases where absolute time delays are important. Use the Vertical Retrace Manager, however, in cases where the scheduled actions need simply to be synchronized with other VBL tasks, such as cursor movement or screen refresh. Applications that do animation on the screen (for example, some games or multimedia applications) are the kinds of programs that should probably use VBL tasks instead of **Time Manager** tasks to perform periodic actions.