Tech Info Library

Filming a Macintosh Screen Without Flicker (11/94)

Revised: 11/7/94
Security: Everyone

Filming a Macintosh Screen Without Flicker (11/94)

==========

Article Created: 14 March 1989
Article Reviewed/Updated: 07 November 1994

TOPIC ----------

This article describes how to film a Macintosh screen without flicker, using a film (movie) camera, rather than with a video camera. A separate article describes filming a Macintosh screen with a video camera. In all cases, you must use a multisync monitor for the Macintosh II to view the screen after these modifications.

Read the entire article, including warnings, before beginning any procedures described here.

DISCUSSION ----------

The techniques given here set up a camera to record the manually genlocked screen. The clock slows the screen updates exactly to the camera frame rate. This makes it possible for all of the horizontal scans to be present during each frame of the camera. The key issue is to slow the video card's video signal. You can do this either by replacing the 30.24MHz clock or by connecting an external signal generator.

WARNING: Any hardware modifications to the video card void the warranty of the video card. Apple Computer does not support any modification to the video card.

CLOCK REPLACEMENT METHOD

To slow the video signal, remove the oscillator from the card and substitute a 5-volt, square-wave, pixel-clock signal at the desired level of 21.77580 MHz. This synchronizes the camera to the screen. However, a visible horizontal/vertical retrace line might appear from the small offset of the two timings.

The clock controls the time period of each pel (displayed picture element) and all display control signals, like the sync (synchronization) signals. For a 48Hz

noninterlaced screen (progressive scan), the Macintosh II video needs an oscillator (pixel clock) of 21.77580 MHz.

Notice that a clock is not the same as the sync. The vertical sync and the horizontal sync are normally 66.67Hz and 35KHz, respectively, on a Macintosh II video card.

THE EXTERNAL PROGRAMMABLE SIGNAL SYNTHESIZER METHOD

The best method is to use an external programmable signal synthesizer (generator) that can be set to the adjusted setting and stored in memory. These units can be found at electronic test-equipment rental houses.

If you do not want to remove the clock, you can ground pin 14 of the J3 connector on the card (pins 1, 2, 3, 5, 7, 9, and 11 of J3 are grounds) and connect the external clock from the signal synthesizer to pin 4 of the J3 connector. This causes the external clock to be selected over the Macintosh II Video Card's 30.24-MHz oscillator. The generator must be on for the video card to function. This method also voids your warranty and is not supported by Apple Computer. The pinouts and signal description of the Macintosh II Video Card can be found under "Macintosh II Video Signals".

Note: The J3 connector is not the external port, but a connector on the video card. Usually, it is located under the serial number sticker.

You must set the synthesized clock signal to 22MHz and wait for the scrolling scan bar (as viewed through a camera) to move off the screen. When you see this, set the signal synthesizer to the proper clock timing of 21.77580 MHz.

Appropriate signal synthesizers include the Wavetek 178 Frequency Synthesizer and the Hewlett Packard 3336C or 8340A. The Wavetek 178 has a resolution of 8 significant digits. This allows for the 21.772800MHz square-wave, 5-volt, pixel clock. To sync the vertical retrace line, the operator sets a 22MHz time in memory. The 22MHz causes a slow scroll of the vertical retrace line. When the line is off the screen in the blanked portion of the screen, the operator executes the 21.772800MHz clock from memory.

Article Change History:
07 Nov 1994 - Reviewed for technical accuracy.

Support Information Services

Tech Info Library Article Number:3725