

Eurapple Scanning

The discussions have been assuming the Apple would be driving an NTSC standard TV, just as the original Apple designer assumed it would be. In the Revision-1 board, Apple changed this by adding "Eurapple" jumpers which change the scanning features of the Apple to be compatible with European TV. This is accomplished by adding 50 horizontal scans to the video scanner and by shifting the vertical sync to maintain approximately equal black margins at the top and bottom of the screen. The horizontal scanning is not affected by the Eurapple jumpers.

European television has 625 horizontal scans in two interlaced fields as compared to NTSC standard 525 scans. Also, European TV scans vertically about 50 times per second as opposed to NTSC standard 60 vertical scans per seconds. The Eurapple jumpers in the Apple cause the vertical portion of the video scanner to preset to 011001000, fifty less than the normal 01111010. This adds 50 scans to the normal 262 for 312 horizontal scans in a Eurapple. All 50 of these scans are added to VBL so that VBL is 120 scans long instead of 70.

In the video generator, Eurapple jumpers change the vertical sync equation to $V5' \bullet V4 \bullet V3 \bullet V2' \bullet V0' \bullet VC' \bullet (H5 + H4)$. The $(H5 + H4)$ portion is $(H5 + H4 + H3)$ in RFI Revision Apples and this horizontal logic adds serrations to the vertical sync identically to 60 Hz configured Apples. In Eurapple scanning, the vertical sync lasts for four horizontal PERIODS, just as in American scanning. These are horizontal

PERIODS 73, 74, 75, and 76 of VBL in Eurapple scanning. By way of comparison, normal Apples have 36 PERIODS in VBL up through vertical sync and 34 PERIODS in VBL afterwards. The Eurapple has 76 PERIODS in VBL up through vertical sync and 44 PERIODS in VBL afterwards. The critical states of VA-V5 in both NTSC standard Apples and Eurapples are summarized in Table 8.1.

The Eurapple jumpers give an Apple scanning compatibility with European television, but not color signal compatibility. Also as part of Revision 1, Apple brought television SYNC and COLOR REFERENCE to previously unused pins 19 and 35 of peripheral Slot 7. One can install a Eurocolor card in Slot 7 which outputs a video signal compatible with PAL or SECAM system televisions, both of which are found in Europe. The 14M crystal must also be changed to a value equal to four times the frequency of the chrominance signal used in a given system.

VIDEO GENERATION TIMING SIGNALS

Video generation timing is based on several signals developed in the timing generator with LDPS' and LD194 defining video output cycles. These and other timing signals are shown in Figure 8.8 along with several examples of video output in the three modes. Actually, LDPS' and LD194 are used to define the same time period, with LDPS' being used when an active low signal is required. In the video generator, TEXT and GRAPHIC patterns are loaded by 14M rising when LDPS' is low, 7M is low, and LD194 is high. The patterns are shifted the rest of the time.

Table 8.1 Eurapple/NTSC Differences.

	START VBL V543210CBA	VERTICAL SYNC V543210CBA	PRESET ON OVERFLOW V543210CBA	VERTICAL SYNC V543210CBA	END VBL V543210CBA
NTSC	111000000	1111000XX	011111010	-----	100000000
EURAPPLE	111000000	-----	011001000	0110100XX	100000000