



AC Coupling on Clock Line

AC Coupling on the Clock Line for the NMG5 and CH7004.

Due to a slight mismatch in effective clock duty cycle between the Neomagic NMG5 and the Chrontel CH7004, there are visual artifacts on the TV display when mode 23 and mode 24 is enabled in the CH7004. To match the duty cycle properly, we recommend the following AC coupling circuit between the clock output of the NMG5 and xclk input of the CH7004. For a more detail description of how AC coupling works, please refer to Chrontel's Application note AN-03. The resistor value in this recommendation are for designs using CH7004 and NMG5 only, and do not apply to other VGA controllers.

For other VGA controllers like NMG6, we recommend implementing the AC coupling circuitry on the board layout as a precaution. Currently, our NMG6 sample works well under all modes without the AC coupling (By replacing the capacitor with a 0 ohm resistor and leaving R1 and R2 open). We will test more NMG6 samples when they are made available to us.

Another commonly used techniques to tune clock duty cycle is by adding pull-up or pull-down resistor between the clock line and power supply or ground. The advantage of using AC coupling over pull-up / pull-down resistor is that the placement and layout of the AC coupling components are not as critical. The 0.1uF capacitor is placed in series between the NMG5 and CH7004, and the resistor R1 and R2 can be placed in any convenient location along the clock line after the 0.1uF capacitor and do not need to be close to either the Ch7004 or the NMG5. The resistors shall be placed close to the clock line so that additional capacitive loading is kept minimal, while Vdd and ground traces can be longer. Another advantage of using AC coupling to set clock duty cycle is that the effect of the duty cycle is less sensitive to variations to the source and sink capabilities of the source device.

