

LM1204

AN-934 Using the LM1204 with Large Horizontal Sync Widths



Literature Number: SNVA030

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National Semiconductor
Application Note 934
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March 1994



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When the LM1204 was first designed, all known raster standards had a horizontal sync pulse width duty cycle under 10% of the total horizontal line period. The part was designed and is tested in production to work with up to a 10% horizontal sync duty cycle. Recently National has received requests for operating the LM1204 with horizontal sync duty cycles up to 20%. For proper detection of sync (either polarity) it is necessary to AC couple the incoming sync signal to pin 23. This enables the LM1204 to detect sync with a peak-to-peak signal as low as 1.2V. Normally pin 23 receives a TTL signal. For negative going pulses there is a natural diode clamp through the substrate diode. There is no equivalent clamp for positive syncs. This causes a loss of sensitivity at pin 23 as the sync pulses become wider. An external clamp must be added to pin 23 for horizontal sync duty cycles over 10%.

The first circuit shown in *Figure 1* gives an accurate clamp at 5V. With this circuit the LM1204 can operate up to a 23% duty cycle for the horizontal sync. The operation of this circuit is quite simple. The base of the 2N3906 is biased to about 4.4V. With the diode drop from pin 23, this transistor

clamps the positive going pulses to 5V. By clamping the input signal at pin 23, the integrator for pulse detection will operate in its optimum range.

If the user has a system where the duty cycle of the horizontal pulse is 15% or less, then the simple diode clamp shown in *Figure 2* can be used. This clamps the input pulse to pin 23 to about 5.7V. This is not quite optimum for the integrator, but is close enough to operate with 15% duty cycles for the horizontal pulse.

Some of the users of the LM1204 have added a resistor from pin 25, the integrator cap connection, to ground. Other users have tried adding a resistor from pin 23 to ground. In both cases the idea is to pull down the level for positive going pulses with large duty cycles. EITHER RESISTOR WILL RESULT IN IMPROPER OPERATION OF THE LM1204! The only acceptable method to use the LM1204 with larger horizontal sync duty cycles is to add a clamp to the incoming signal at pin 23 as covered in this application note.

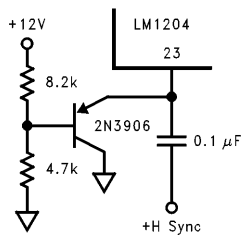


FIGURE 1

TL/H/12026-1

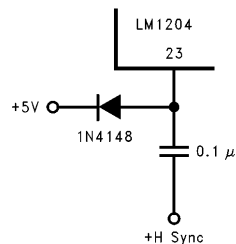


FIGURE 2

TL/H/12026-2

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