1 Overview

This document describes the anti-aliasing filters used on the TVP5147EVM Rev1.1. They are designed based on the sampling frequencies of the ADC(s) given the particular input and apply to both NTSC and PAL video color standards. The filters are also designed to minimize system costs by using standard EIA values.

Table 1. TVP5147 EVM Anti-Aliasing Filter Specifics

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Sampling Frequency ($f_s$)</th>
<th>Cutoff Frequency ($f_c$)</th>
<th>Oversampling</th>
<th>ADCs Used</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVBS</td>
<td>27MHz</td>
<td>~6.8MHz</td>
<td>2x</td>
<td>1</td>
<td>Each ADC provides 2x oversampling with CVBS</td>
</tr>
<tr>
<td>S-Video</td>
<td>27MHz</td>
<td>~6.8MHz</td>
<td>2x</td>
<td>2</td>
<td>Both Y and C are 2x oversampled using two ADCs</td>
</tr>
<tr>
<td>Y</td>
<td>27MHz</td>
<td>~6.8MHz</td>
<td>2x</td>
<td>1</td>
<td>YPbPr is 2x oversampled using one ADC</td>
</tr>
<tr>
<td>Pb/Pr</td>
<td>13.5MHz</td>
<td>~6.8MHz</td>
<td>1x</td>
<td>1</td>
<td>PbPr of YPbPr is sampled using one ADC</td>
</tr>
</tbody>
</table>

2 Anti-Aliasing Filter for CVBS, S-Video, and YPbPr

This anti-aliasing filter is designed for the CVBS, S-Video and YPbPr input signals on the TVP5147M1 EVM Revision 1.1. The frequency response and group delay curves for this filter design are shown below.

Figure 1. Schematic
Figure 2. Frequency Response

Figure 3. Group Delay Response
### Table 2. Example Anti-Aliasing Filter Characteristics (Detail)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Composite Filter Amplitude</th>
<th>Delay</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.58 MHz</td>
<td>-0.05 dB</td>
<td>89 ns</td>
<td>NTSC color subcarrier</td>
</tr>
<tr>
<td>4.2 MHz</td>
<td>-0.1 dB</td>
<td>89 ns</td>
<td>NTSC bandwidth</td>
</tr>
<tr>
<td>4.43 MHz</td>
<td>-0.1 dB</td>
<td>97 ns</td>
<td>PAL color subcarrier</td>
</tr>
<tr>
<td>6.0 MHz</td>
<td>-1.1 dB</td>
<td>123 ns</td>
<td>PAL-D bandwidth</td>
</tr>
<tr>
<td>13.5 MHz</td>
<td>-31 dB</td>
<td>21 ns</td>
<td>Pixel rate</td>
</tr>
<tr>
<td>27.0 MHz</td>
<td>-61.8 dB</td>
<td>4 ns</td>
<td>Sample rate</td>
</tr>
</tbody>
</table>
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