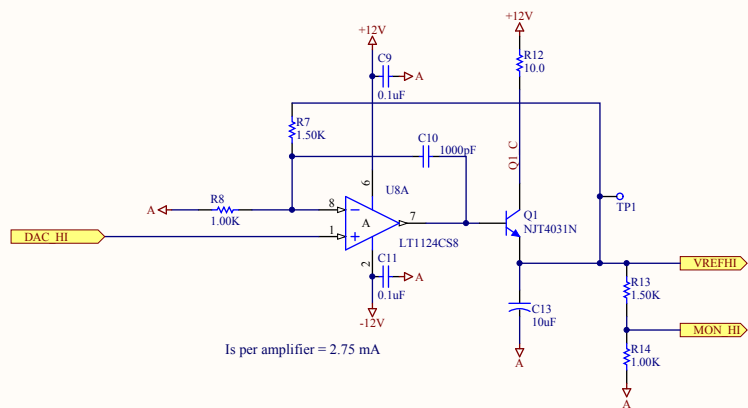


| PH_CLK | Signal  | P3 |
|--------|---------|----|
| 1      | S1Q1    | 2  |
| 2      | S1Q2    | 4  |
| 3      | S1Q3    | 6  |
| 4      | S1Q4    | 8  |
| 5      | S2Q1    | 3  |
| 6      | S2Q2    | 13 |
| 7      | S2Q3    | 12 |
| 8      | S2Q4    | 14 |
| 9      | S3      | 15 |
| 10     | RG      | 9  |
| 11     | SG      | 11 |
| 12     | P1A     | 1  |
| 13     | P1B     | 5  |
| 14     | P2A     | 10 |
| 15     | P2B     | 7  |
| 16     | P3A     | 16 |
| 17     | P3A MPP | 17 |
| 18     | P3B     | 18 |
| 19     | P3B MPP | 19 |
| 20     | TGA     | 20 |
| 21     | TGA MPP | 21 |
| 22     | TGB     | 22 |
| 23     | TGB MPP | 23 |

| CDO | DRIVE |
|-----|-------|
| 1   | S1Q1  |
| 2   | S1Q2  |
| 3   | S1Q3  |
| 4   | S1Q4  |
| 5   | S2Q1  |
| 6   | S2Q2  |
| 7   | S2Q3  |
| 8   | S2Q4  |
| 9   | S3    |
| 10  | RG    |
| 11  | SG    |
| 12  | P1A   |
| 13  | P1B   |
| 14  | P2A   |
| 15  | P2B   |
| 16  | P3A   |
| 17  | P3B   |
| 18  | TGA   |
| 19  | TGB   |

|                              |                                  |           |        |
|------------------------------|----------------------------------|-----------|--------|
| Title                        |                                  |           |        |
| SINISTRO CAMERA CLOCK DRIVER |                                  |           |        |
| REV. DATE JAN 2, 2013        |                                  |           |        |
| Size                         | Number                           | Revision  |        |
| B                            | 780-00002                        | 4         |        |
| Date:                        | 1/7/2013                         | Sheet of  | 2 OF 7 |
| File:                        | \\.\Sinistro Clk 30 Rev 4.SchDoc | Drawn By: |        |



Is per amplifier = 2.75 mA

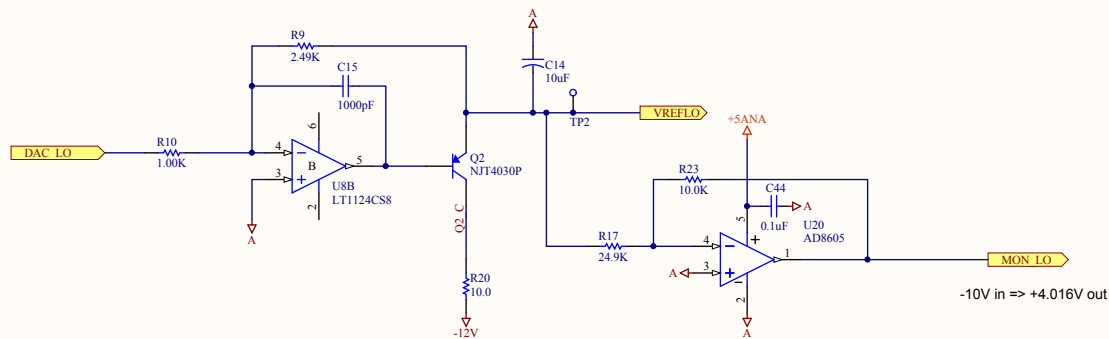
Max quiescent pwr for U8 = 132 mW

Max q pwr for Q1 or Q2 (+6V/-6V out) = 21.6 mW

### Power Dissipation (worst case)

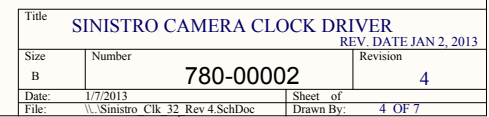
|             | U8    | Q1 or Q2 quiescent<br>(Vout = +/- 6V) | Q1 or Q2 Load*<br>(Vout = +/- 6V) | Total W (U8 + Q1 +Q2) |
|-------------|-------|---------------------------------------|-----------------------------------|-----------------------|
| VREFHI/LO 1 | 132mW | 21.6mW                                | 319 mW                            | 814 mW                |
| VREFHI/LO 2 | "     | "                                     | neg                               | 175 mW                |
| VREFHI/LO 3 | "     | "                                     | neg                               | 175 mW                |
| VREFHI/LO 4 | "     | "                                     | 406 mW                            | 988 mW                |
| VREFHI/LO 5 | "     | "                                     | 288 mW                            | 752 mW                |
| VREFHI/LO 6 | "     | "                                     | 9.2 mW                            | 194 mW                |
|             |       |                                       |                                   | <b>2.92 W</b>         |

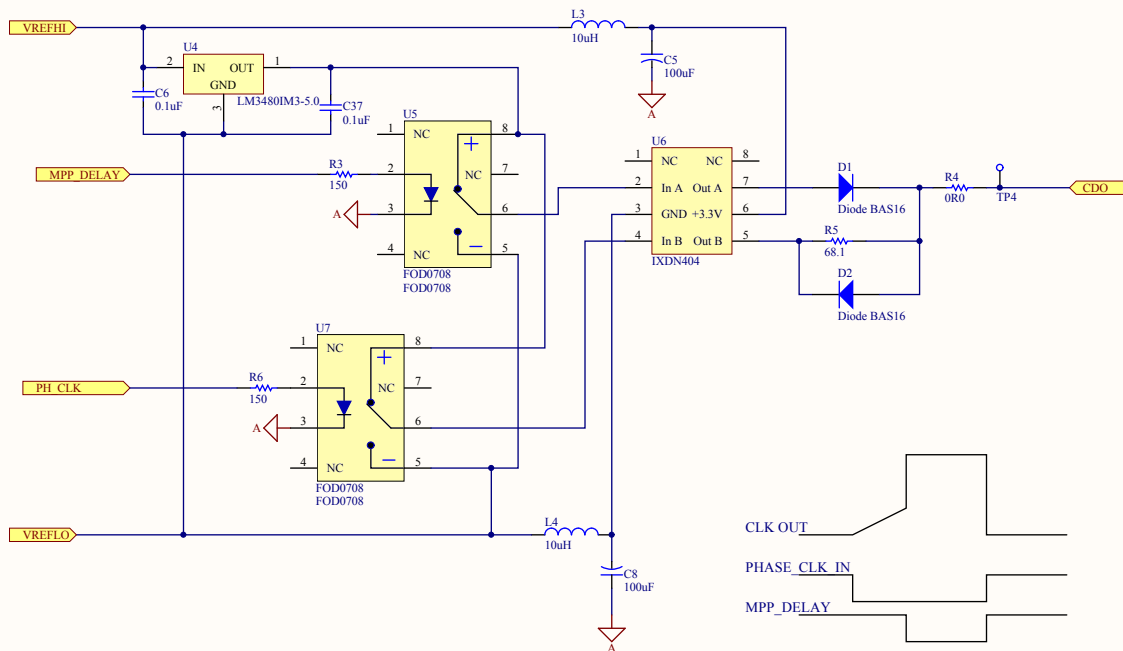
\*1 MHz pixel rate/all quadrants clocked



-10V in => +4.016V out

|       |                                  |                              |          |
|-------|----------------------------------|------------------------------|----------|
| Title |                                  | SINISTRO CAMERA CLOCK DRIVER |          |
| Size  |                                  | REV. DATE JAN 2, 2013        |          |
| B     | Number                           | 780-00002                    | Revision |
|       |                                  |                              | 4        |
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|       |                                 |                              |          |
|-------|---------------------------------|------------------------------|----------|
| Title |                                 | SINISTRO CAMERA CLOCK DRIVER |          |
| Size  |                                 | REV. DATE JAN 2, 2013        |          |
| B     | Number                          | 780-00002                    | Revision |
| Date: | 1/7/2013                        | Sheet of                     | 4        |
| File: | \\.\Sinistro_Clk_33_Rev4_SchDoe | Drawn By:                    | 5 OF 7   |

DAC output swings between zero 4.096V

Quiescent current for 1124  
2.75 mA each amp

Worst Case PWR dissipation this page = 770 mW

Pd of Q3:  
(14.5V/4.32K)\*13.5V = 45 mW

Swings between  
+14.5V and +27.3V

Swings between  
+6V and +18V

Pd of Q4:  
(14-2.66V)/6.04K\*14V = 26.5 mW

MON VOG swings between zero  
and +4.096V for an input of +5V to  
-7V

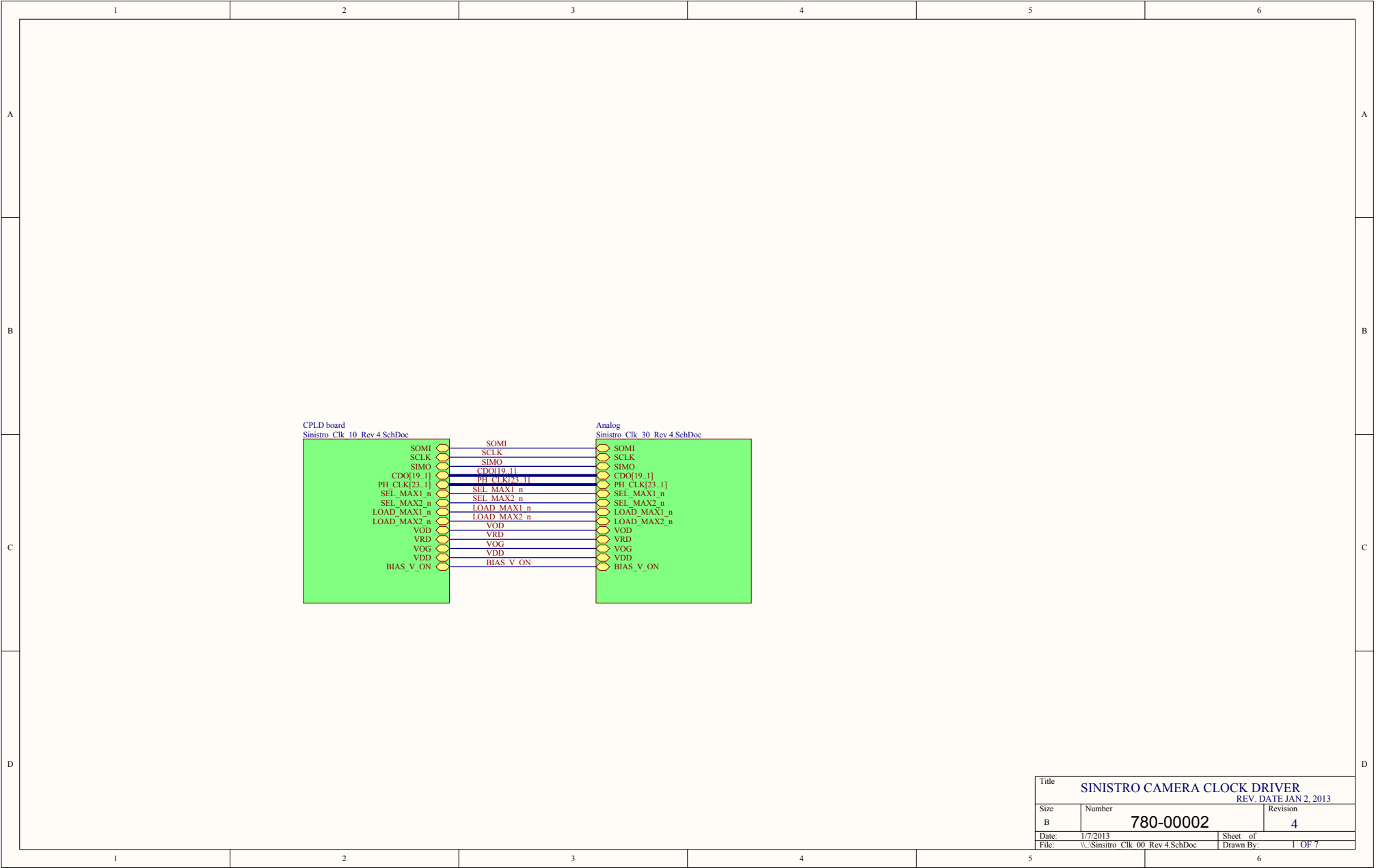
Swings between  
-7V and +5V

Swings between  
+13 V to +17 V  
used with e2V only

Pd of Q5:  
(14-0.27V)/2.61K\*14V = 73.6 mW

3 of the 4 bias voltages need to output a voltage  
between 8 and 27V so they need rails that go  
between 0 and +28V. The 4th bias needs to go from  
-7 to +5 and needs +/- 12V rails. 1 used 3 dual  
op-amps to provide this functionality.

|                              |                                  |           |        |
|------------------------------|----------------------------------|-----------|--------|
| Title                        |                                  |           |        |
| SINISTRO CAMERA CLOCK DRIVER |                                  |           |        |
| REV. DATE JAN 2, 2013        |                                  |           |        |
| Size                         | Number                           | Revision  |        |
| B                            | 780-00002                        | 4         |        |
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|       |                                  |  |  |                              |        |
|-------|----------------------------------|--|--|------------------------------|--------|
| Title |                                  |  |  | SINISTRO CAMERA CLOCK DRIVER |        |
|       |                                  |  |  | REV. DATE JAN 2, 2013        |        |
| Size  | Number                           |  |  | Revision                     |        |
| B     | 780-00002                        |  |  | 4                            |        |
| Date: | 1/7/2013                         |  |  | Sheet of                     |        |
| File: | \\.\Sinistro Clk_00_Rev 4.SchDoc |  |  | Drawn By:                    | 1 OF 7 |

