

**DECam 12-Channel Transition Board V3  
Review and proposed changes**

**3/19/09**

- 1. On the schematic anywhere there is a 0 ohm resistor that is labeled as a spare or it's intended use is to be a spare that resistor should be changed to a generic resistor that has the open label. This in turn will force that new part to be placed onto the PCB layout. This will hopefully eliminate the assembler or future users from placing a 0 ohm short in that location(unless it is intended).**
- 2. The Backplane connector reference designators should be labeled as P5, P4, P3. P5 towards the top of the board.**
- 3. A silkscreen should be added to the bottom of the board that labels the Backplane connectors (P5-P3) and also the pin number 1 location along with row identification(A-F).**
- 4. Determine correct fuse rating for analog power onto and off the board.**
- 5. Add two additional fuses to the Preamp power selection area, move that area down to the area around J13(V3). Each fuse should connect to 3 output pins on J8(V3)(instead of 6).**
- 6. Move the VSUB trace on layer 2 so that it's not close to the video input signal.**

- 7. Reroute the Input and Output Video signals on the top side of the board to eliminate the distance between the differential traces at the resistor connections.**
- 8. Add Analog Ground LANDS to the top and bottom of the board to shield the Input and Output Video Differential traces.**
- 9. Add Analog Ground lands on layer 2, 3, 10, 11 to isolate the differential video signals from each other.**
- 10. Add silkscreen text where needed to clarify the options on the board.**

# DECam 12-Channel Transition Board V3

3/17/09

Major change areas:

## **1. Video Channels**

- a. Schematic
- b. Layout
- c. Input Routing
- d. Output Routing

## **2. RTD signal routing**

## **3. BIAS Filter signal routing**

## **4. Video Channel Power supplied to preamps**

## **5. Hot Swap Circuits**

## **6. Analog Power Return**

- a. Analog Ground plane

## **7. Cable shield -grounding Options**

- a. Front Panel Ground
  - i. Schematic
  - ii. Layout
- b. Connector Shield
  - i. Front Panel Connector
  - ii. Backplane Connector

## **1. Video Channel Changes**

1. Schematic
  - a. Removal of the gain stage – 2 less resistors and one dual channel JFET package per channel.
  - b. Bypass of the receiver circuitry – added 1 resistor per channel to remove the trace stubs that were present in version 2.
2. Layout
  - a. Particular attention was made to shorten trace length between components.
  - b. Parts were rotated to put all the VIA's associated with a channel on the outside of the parts to allow for differential traces to be routed without obstructions.
3. Input Routing
  - a. The input connector dictated that we should put the higher number video channel at the top of the board as opposed to version 2 where channel 0 and 1 were at the top of the board. This allowed for a better routing scheme from the input connector to the video channels. Eliminated having channels cross over each other on the inner layers.
  - b. Particular attention was paid to the spacing of the differential Video inputs signals so that there were 3 pairs on each of the 4 layers and the channels were spread out within a layer and also with the adjacent layer.
4. Output Routing
  - a. Particular attention was paid to the spacing of the differential Video output signals so that there was 3 pairs on each of the 4 layers and the channels were spread out within a layer.
  - b. Channels were placed on particular layers to prevent the adjacent channels from being on the same layer.

Page 4 shows the video channel routing on the top side channels for the version 2 board and for the version 3 board.

Page 5 shows the video channel routing on the bottom side channels for the version 2 board and for the version 3 board.

Pages 6 & 7 show the routing of the input and output video signals on each of the four signal layers.

**2. RTD signal routing** – Traces were made differential, Channels were spread out between layers and also within layer. Pages 6-8 show the RTD routing.

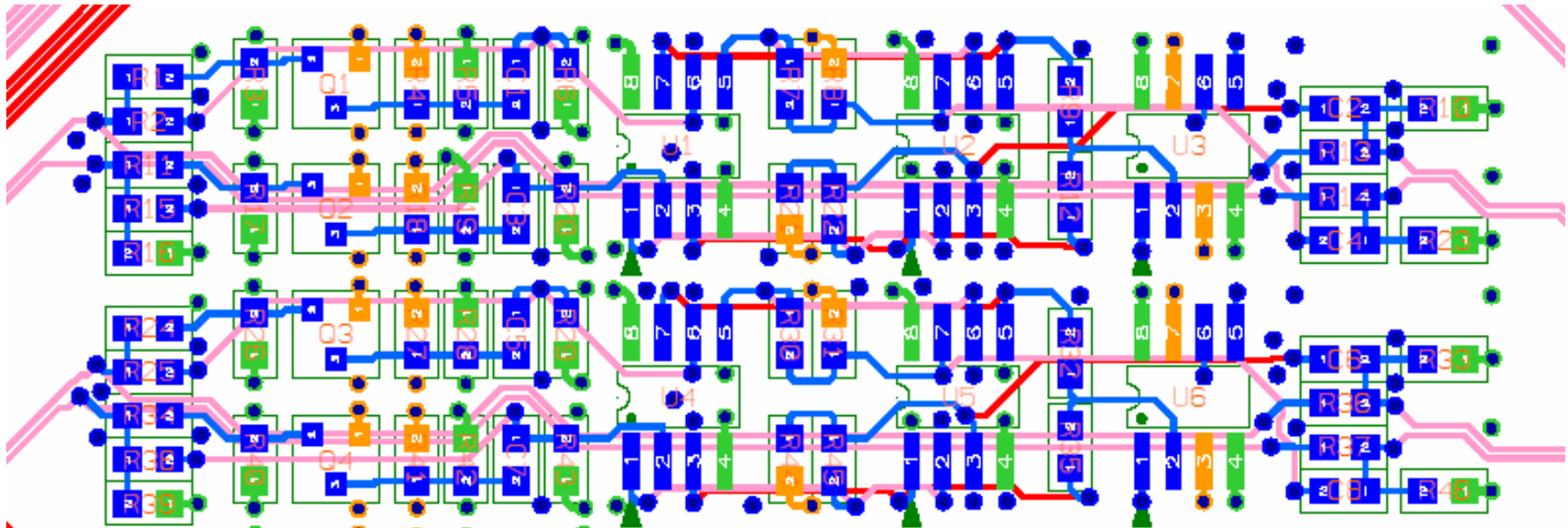
**3. BIAS Filter signal routing** – Traces were spread out within the 4 signals layers to minimize trace length and adjacent runs. The size of the trace widths were increased to a width of 10(from 8 on version 2). The size of the TRACES and VIAS to AGND were also increased. Pages 6-7 show the BIAS Filter routing.

**4. Video Channel Power** was changed in a manner that the individual small traces that connected the power to the output pins were replaced by a connection to a land through a via – as opposed to a size 8 trace which connected a 0 ohm short to a land. The circuitry was also changed so that 2 fuses were eliminated. This eliminates the possibility of a fuse unknowingly being inserted into a socket which would connect two power rails together, instead an individual will need to install a 0 ohm short onto the board to make the mistake(hopefully the installation of the resistor will be more of a challenge than the plugging in of a fuse).

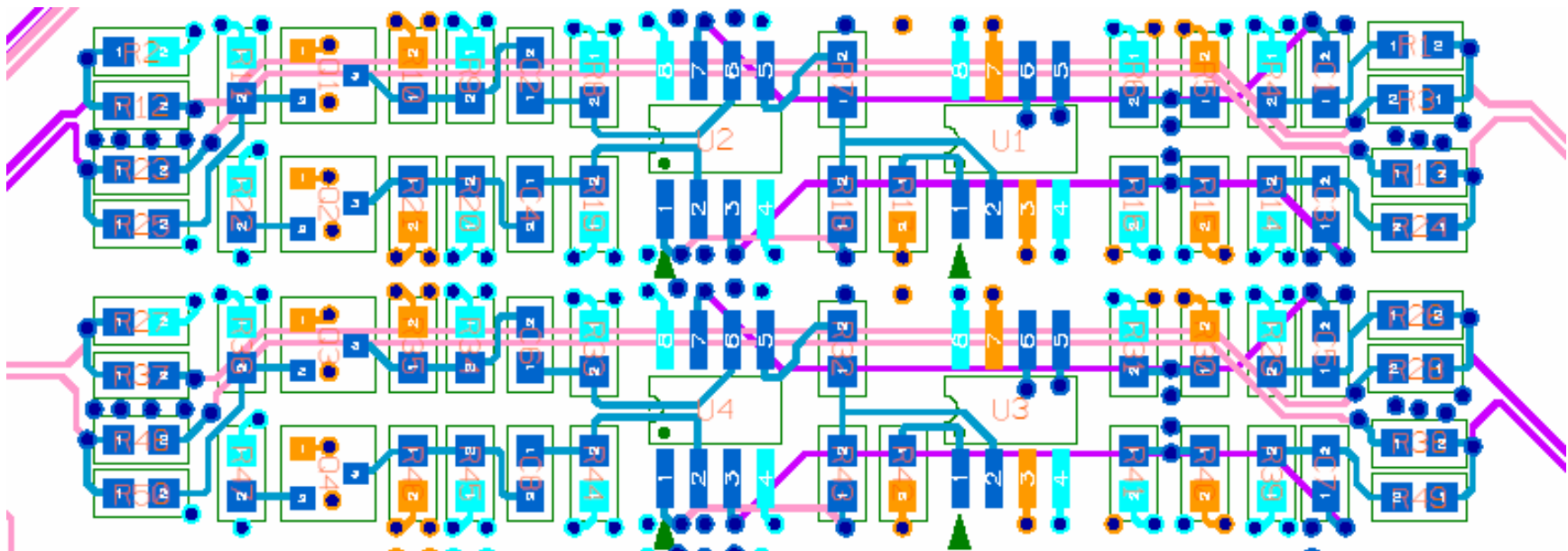
**5. Hot Swap Circuit** schematics were mainly changed in how the nShutdown signal was generated. The layouts remain basically the same with the exception of most of the spare resistors being removed. For the -28v and the +48v circuits a jumper was added to bypass the Hot Swap circuits similar to the +/-5 and +/- 15 circuits. The -28v Hot Swap circuit was switched from a LT1640H to a LT1640L part. See the schematic pages.

**6. Individual Analog Power Return** nets were removed from the schematic and the layout so that the AGND plane connects directly to the Analog backplane instead of through a 0 ohm resistor to the return ground land and then to the AGND plane. This allows the two AGND planes to cover the whole layer.

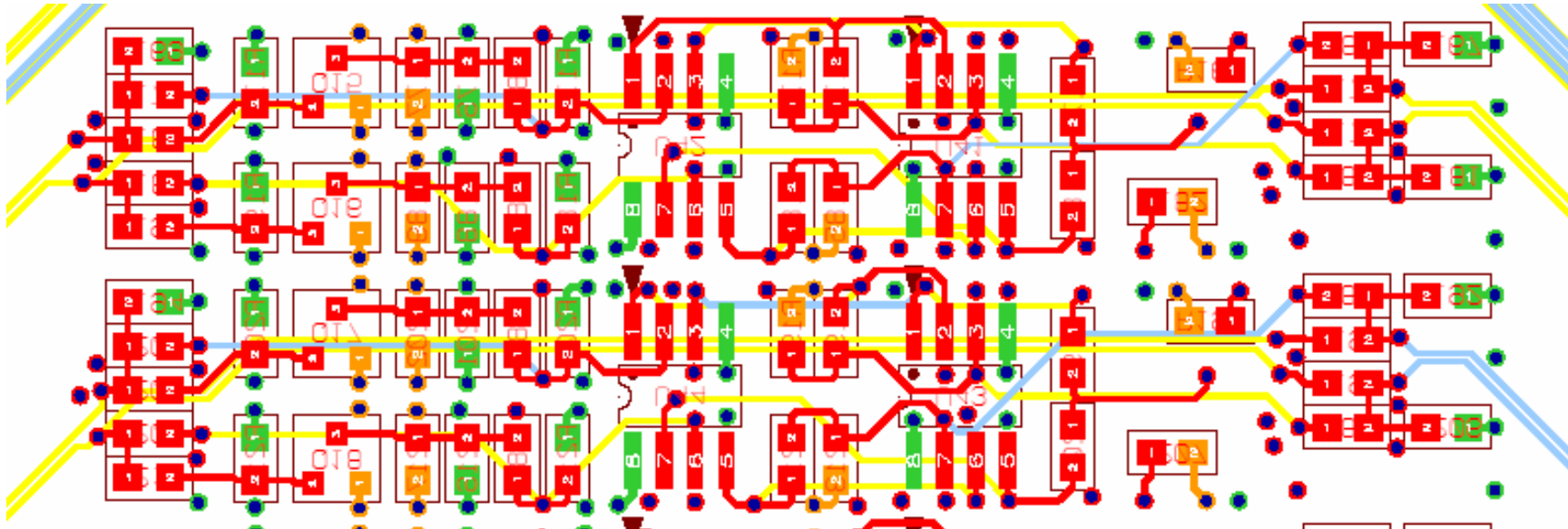
**7. Grounding Options of the Video/Bias/RTD cables.** An individual land which connects the shields of that particular connector/cable together can be connected to the land which the Front Panel connects to or to AGND which is on Layers 4 and 9, the AGND planes cover the complete board. The connection is made to either AGND or Front Panel Ground by placing a piece of braid between the appropriate through holes on the top of the board. With the Version 2 boards there were 3 shorts(0 ohm surface mount resistors) needed to make the connection for each of the 3 cables. Shown on page 9.



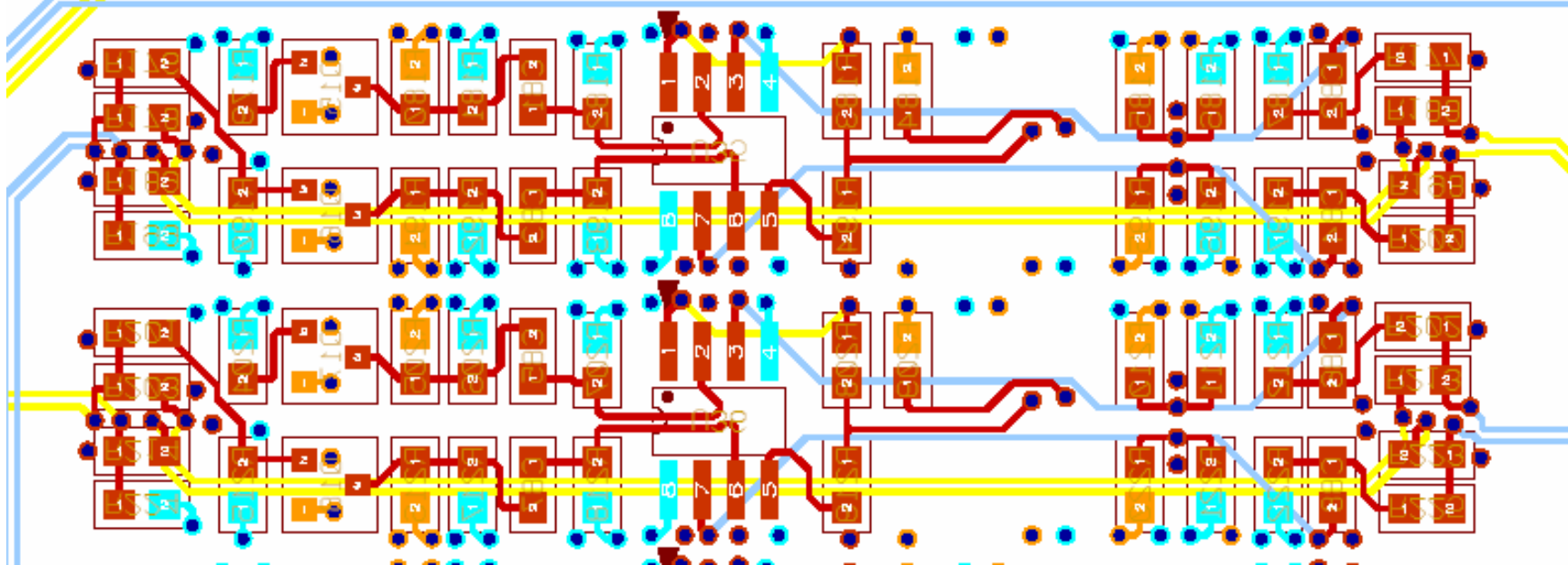
**Version 2 Top layer** – Two Video channels layout, Blue:Layer 1, Pink:Layer 2, Red:Layer 3, Green:Analog Ground, Orange:-28v



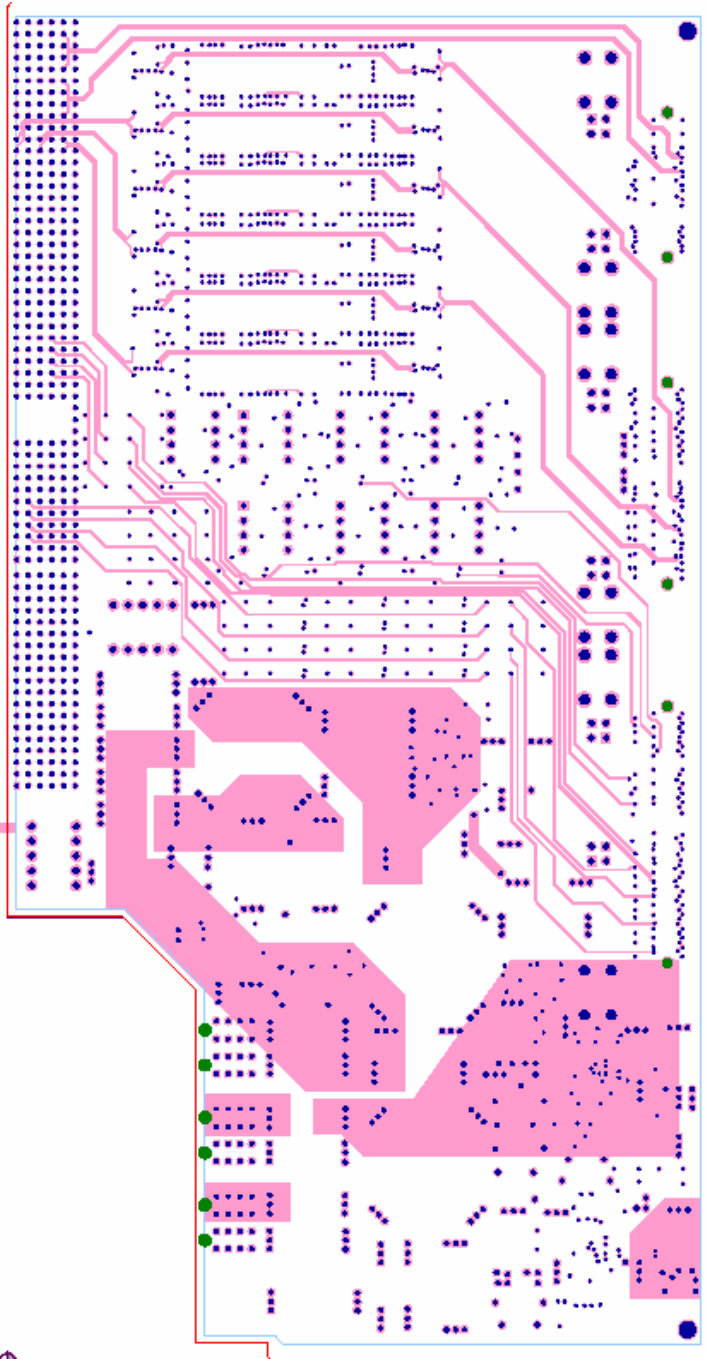
**Version 3 Top layer** – Two Video channels layout, Blue:Layer 1, Pink:Layer 2, Purple:Layer 3, Lt. blue:Analog Ground, Orange:-28v



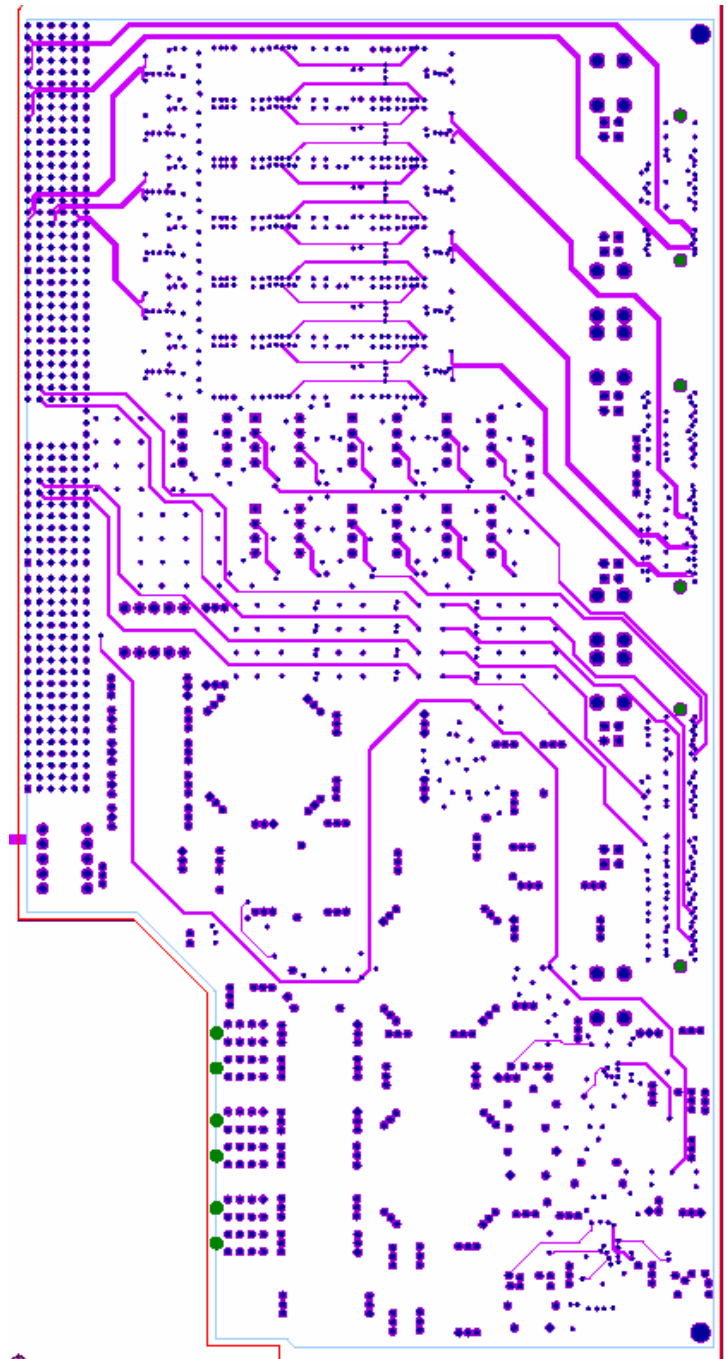
**Version 2 Bottom side of board** – Two Video channels layout, Red:Layer 12, Yellow:Layer 11, Lt. Blue:Layer 10, Green:Analog Ground, Orange:-28v



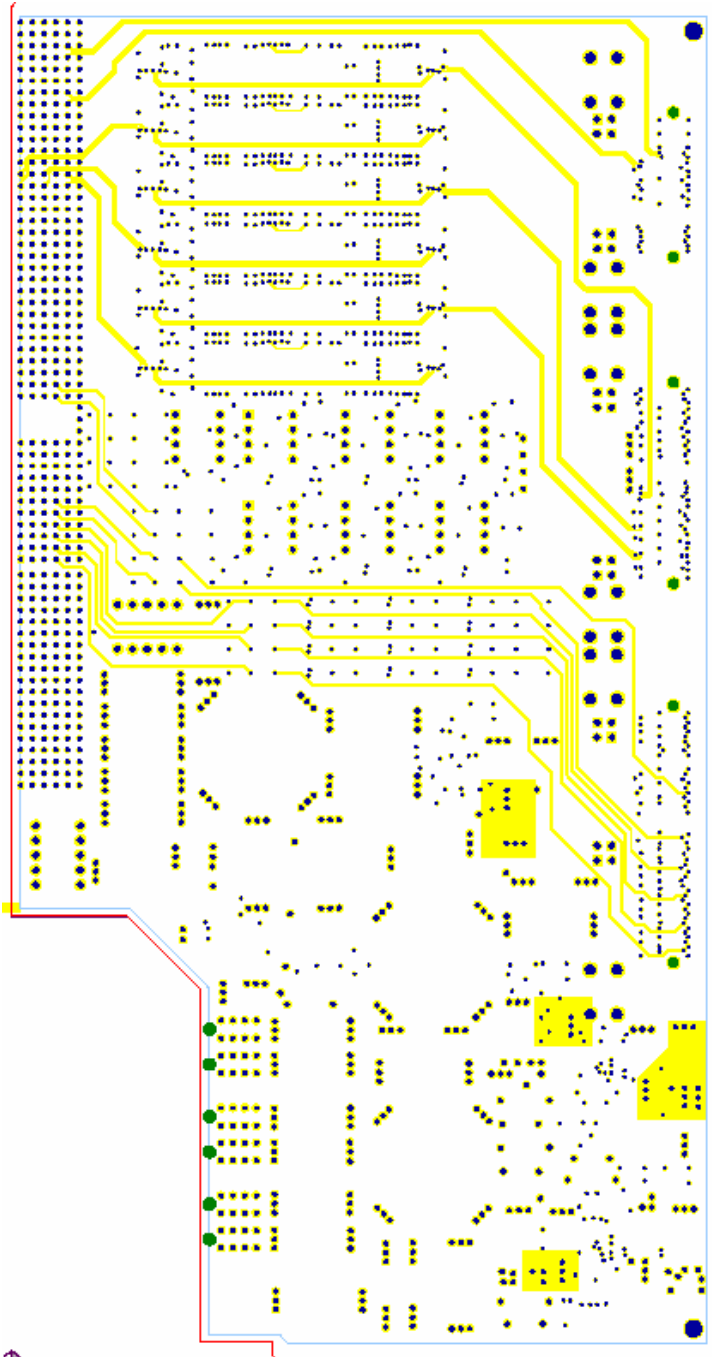
**Version 3 Bottom side of board** – Two Video channels layout, Red:Layer 12, Yellow:Layer 11, Gray-Blue:Layer 10, Lt. Blue:Analog Ground, Orange:-28v



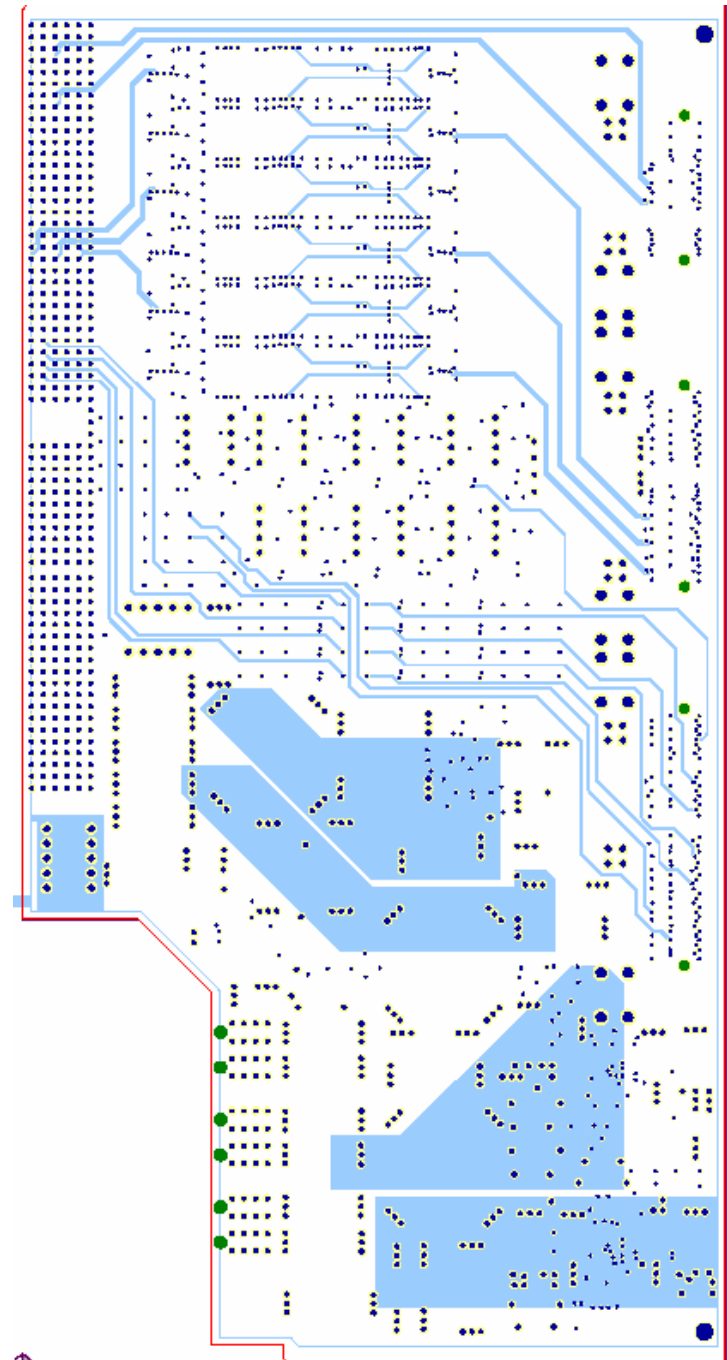
<<< Layer 2  
Layer 3 >>>

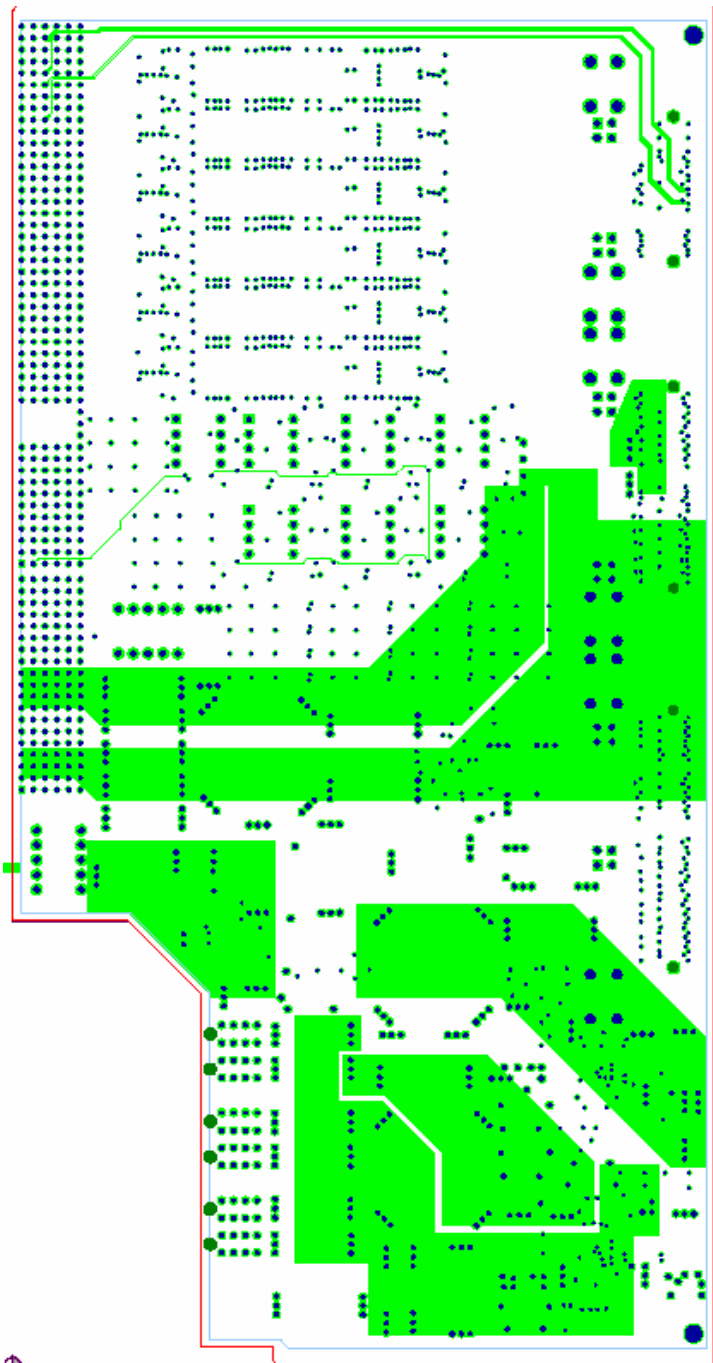






<<< Layer 11  
Layer 10 >>>





<<< Layer 6  
Layer 8 >>>

