TAP Video Board
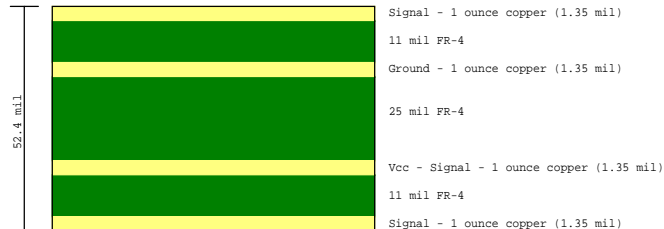## Rev 1.0 - Summer 2005

Schematic Pages:

Suggested stackup:
(7 mil trace on top layer is Zo=75ohm)

52.4 mil

Signal - 1 ounce copper (1.35 mil)

11 mil FR-4

Ground - 1 ounce copper (1.35 mil)

25 mil FR-4

Vcc - Signal - 1 ounce copper (1.35 mil)

11 mil FR-4

Signal - 1 ounce copper (1.35 mil)

Rice University

Title
TAP Video Daughtercard

RICE

Description
Table of Contents

Rev
x1

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AVDD_3.3v
DVDD_3.3v
+ C76 10uF   C32 0.1uF   C75 10nF
+ C81 10uF   C44 0.1uF   C22 10nF   C23 0.1uF   C45 10nF
GND
GND

AVDD_1.8v
DVDD_1.8v
C12 0.1uF   C14 10nF
+ C74 10uF   C15 0.1uF   C53 10nF   C34 0.1uF   C33 10nF   C56 0.1uF   C13 10nF
GND
GND

75 Ohm Traces - 8 mil with 1oz CU over 11 mil FR-4

AVDD_3.3v DVDD_3.3v AVDD_1.8v   DVDD_1.8v

U5
10 DVDD
72 DVDD
30 DVDD
38 PVDD
4 DVDDIO
15 DVDDIO
50 AVDD
13 NC_13
16 NC_16
25 NC_25
63 NC_63
65 NC_65
69 NC_69
70 NC_70
77 NC_77
78 NC_78
29 XTAL
28 XTAL1
37 ELPF
51 REFOUT
52 CML
54 CAPC1
55 CAPC2
48 CAPY1
49 CAPY2

56 AGND
53 AGND
47 AGND
40 AGND
39 AGND
71 DGND
31 DGND
14 DGND
9 DGND
3 DGND

ADV7189B

AIN4 58   C46 0.1uF   SVIDEO_IN_C
AIN1 42   C18 0.1uF   SVIDEO_IN_Y
AIN2 44   C19 0.1uF   COMP_IN_Y
AIN3 46   C21 0.1uF   COMP_IN_Pr
AIN6 62   C54 0.1uF   COMP_IN_Pb
AIN5 60   C48 0.1uF   COMPOSITE_IN
AIN7 41
AIN8 43
AIN9 45
AIN10 57
AIN11 59
AIN12 61

R56 75 R45 75 R46 75 R41 75 R42 75 R43 75

J7
GND

J3
3 GREEN
5 RED
2 BLUE
1 GND
  GND
3xRCA-JACK

J4 Female Jack
4 C   Y 3
2 GND GND 1
SVIDEO_CONN

VS   1 R53 33   VIDEO_IN_VS 5
HS   2 R52 33   VIDEO_IN_HS 5
FIELD 80 R19 33   VIDEO_IN_FIELD 5
INTRQ# 11 R51 33 VIDEO_IN_INTRQ# 5
LLC1 27 R12 33
LLC2 26 R13 33   VIDEO_IN_LLC2 5

R44 0   VIDEO_IN_LLC1_FPGA 5
R46 NM - 0

J5
2 GND
3 GND
4 GND
5 GND
1 PIN GND
NM - MMCX Jack

DVDD_3.3v
R24 4.7k
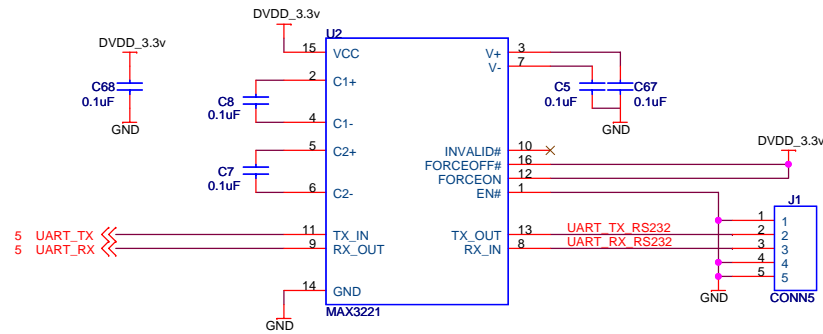VIDEO_IN_RESET# 5
C57 0.1uF
GND

RST# 64
OE#   79   R47 4.7k   VIDEO_IN_OE# 5
PWDN# 36   VIDEO_IN_PWDN# 5
ALSB 66   VIDEO_IN_ASLB 5
SCLK 68   R16 100
SDA   67   R17 100   VIDEO_IN_SCLK 5
                     R18 100   VIDEO_IN_SDA 5
DVDD_3.3v
R25 2k R22 2k

SFL   12 R49 33   VIDEO_IN_SFL 5   GND

P0 35   RN1 33 5%
P1 34   VIDEO_IN_P0 5
P2 33   VIDEO_IN_P1 5
P3 32   VIDEO_IN_P2 5
P4 24   VIDEO_IN_P3 5
P5 23
P6 22   RN2 33 5%
P7 21   VIDEO_IN_P4 5
P8 20   VIDEO_IN_P5 5
P9 19   VIDEO_IN_P6 5
P10 18   VIDEO_IN_P7 5
P11 17
P12 8   RN4 33 5%
P13 7   VIDEO_IN_P8 5
P14 6   VIDEO_IN_P9 5
P15 5   VIDEO_IN_P10 5
P16 76   VIDEO_IN_P11 5
P17 75
P18 74   RN5 33 5%
P19 73   VIDEO_IN_P12 5
                  VIDEO_IN_P13 5
                  VIDEO_IN_P14 5
                  VIDEO_IN_P15 5

RN3 33 5%
VIDEO_IN_P16 5
VIDEO_IN_P17 5
VIDEO_IN_P18 5
VIDEO_IN_P19 5

Y1 27MHz
C6 15pF   C11 15pF
C72 82nF   R48 1.7k 1%
C70 82nF

C30 10uF C26 0.1uF
C35 10uF C36 0.1uF
C39 10uF C40 0.1uF C41 1nF
C37 0.1uF
C27 10uF C29 0.1uF C28 1nF
C25 0.1uF

GND

DVDD_3.3v

+ C82
10uF

C83
0.1uF

C84
10nF

AVDD_3.3v

+ C87
10uF

C89
0.1uF

C55
0.1uF

C88
10nF

C85
10nF

GND

GND

DVDD_3.3v   AVDD_3.3v

U8

C61
0.1uF

C60
0.1uF

31 AVDD
30 AVDD
12 DVDD
34 COMP
35 VREF

R0 40
R1 41
R2 42
R3 43
R4 44
R5 45
R6 46
R7 47

VIDEO_OUT_R0 5
VIDEO_OUT_R1 5
VIDEO_OUT_R2 5
VIDEO_OUT_R3 5
VIDEO_OUT_R4 5
VIDEO_OUT_R5 5
VIDEO_OUT_R6 5
VIDEO_OUT_R7 5

13 NC_12
24 NC_24
25 NC_25
37 NC_37

G0 2
G1 3
G2 4
G3 5
G4 6
G5 7
G6 8
G7 9

VIDEO_OUT_G0 5
VIDEO_OUT_G1 5
VIDEO_OUT_G2 5
VIDEO_OUT_G3 5
VIDEO_OUT_G4 5
VIDEO_OUT_G5 5
VIDEO_OUT_G6 5
VIDEO_OUT_G7 5

J9

1 VGA_RED_OUT
2 VGA_GREEN_OUT
3 VGA_BLUE_OUT
4
5
6
7
8
9
10
11
12
13
14
15

VGA

HDSUB15-VGA

33 IOR
32 IOG
29 IOB

B0 16
B1 17
B2 18
B3 19
B4 20
B5 21
B6 22
B7 23

VIDEO_OUT_B0 5
VIDEO_OUT_B1 5
VIDEO_OUT_B2 5
VIDEO_OUT_B3 5
VIDEO_OUT_B4 5
VIDEO_OUT_B5 5
VIDEO_OUT_B6 5
VIDEO_OUT_B7 5

36 RREF

R33
348 1%

1 GND
14 GND
28 GND
38 GND
39 GND
48 GND
27 GND
15 GND

CLK 26

R54 20 1%

VIDEO_OUT_PCLK 5

SYNC# 11
BLANK# 10

VIDEO_OUT_SYNC# 5
VIDEO_OUT_BLANK# 5

R59 82.5 1%   VGA_HSYNC 5
R58 82.5 1%   VGA_VSYNC 5

R27
75 1%

R26
75 1%

R23
75 1%

R20
3.3k

FMS3818

GND

DVDD_3.3v

J2

15 VCC

V+ 3
V- 7

C68
0.1uF

C5
0.1uF

C67
0.1uF

2 C1+
4 C1-

C8
0.1uF

GND

GND

5 C2+
6 C2-

C7
0.1uF

INVALID# 10
FORCEOFF# 16
FORCEON 12
EN# 1

DVDD_3.3v

J1

5 UART_TX
5 UART_RX

11 TX_IN
9 RX_OUT

TX_OUT 13
RX_IN 8

UART_TX_RS232
UART_RX_RS232

1
2
3
4
5

1
2
3
4
5

14 GND

GND

MAX3221

GND

CONN5

Adjustable version of LT1963
to allow a 5v output
R2=6.2k, R1=2k => Vout=4.98v
(see pg. 11 of LT1963 datasheet)

EXT_12v

EXT_12v   VDD_5v   R11 200

R1 820
C16
10uF

U3
IN   VOUT
SHDN
ADJ
GND
LT1963A_TO220

R5
6.2k

C17
10uF

D5
LED_RED

R6
2k

D4
LED_RED

GND

EXT_12v
+ C64
10uF C1   C3   C65   C2
0.1uF   10nF   0.1uF 10nF

+ C38
10uF C79   C71
0.1uF   10nF

GND

VDD_5v
+ C63
10uF C47   C51   C86   C73   C69   C77   C86   C59
0.1uF   10nF   0.1uF 10nF 0.1uF 10nF 0.1uF 10nF

GND
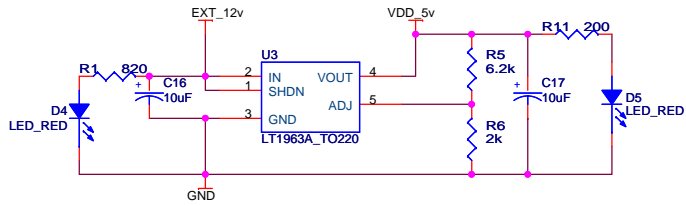
DVDD1.8v: 82mA
DVDD3.3v: 92+uart mA
AVDD1.8v: 180mA
AVDD3.3v: 10.5mA

VDD_5v   U1   AVDD_1.8v
VIN   VOUT
EN
NR
GND
TPS79318_DBV

C31
1uF

C10
2.2uF

C9
10nF

GND

TP8   TP4   EXT_12v   VDD_5v
GND   GND   TP2   TP1

AVDD_3.3v   DVDD_3.3v
TP7   TP6

AVDD_1.8v   DVDD_1.8v
TP3   TP5

VDD_5v   U4   DVDD_1.8v
VIN   VOUT
EN
NR
GND
TPS79318_DBV

C80
1uF

C24
2.2uF

C20
10nF

GND

EXT_12v   VDD_5v

J2   NM
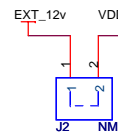
Jumper to bypass 12v->5v regulator
In case later TAP FPGA boards use 5v
supplies for daughtercards
These should be mounted only if the
LT1963's are not

VDD_5v   U7   AVDD_3.3v   R28 160
VIN   VOUT
EN
NR
GND
TPS79333_DBV

C49
1uF

C78
2.2uF

C52
10nF

GND

J6
1   1
MHOLE   GND

VDD_5v   U6   DVDD_3.3v   R14 160
VIN   VOUT
EN
NR
GND
TPS79333_DBV

C4
1uF

C50
2.2uF

C42
10nF

GND

D6   D7
LED_RED LED_RED

GND

EXT_-12v EXT_12v   EXT_12v EXT_-12v   EXT_-12v EXT_12v   EXT_12v EXT_-12v

J8B   J8A

2   VIDEO_IN_VS   81 81 121 121   SLOT3_VRN   1   1   41 41
2   VIDEO_IN_HS   82 82 122 122   VGA_HSYNC   3   SLOT1_VRP   2   2   42 42
2   VIDEO_IN_P15   83 83 123 123   VGA_VSYNC   3   SLOT3_VRP   3   3   43 43
2   VIDEO_IN_P14   84 84 124 124   VIDEO_OUT_R0 3   4   4   44 44
                         85 85 125 125   VIDEO_OUT_R1 3   5   5   45 45
2   VIDEO_IN_P13   86 86 126 126   SLOT1_VRN   6   6   46 46
2   VIDEO_IN_P12   87 87 127 127   VIDEO_OUT_R2 3   7   7   47 47
2   VIDEO_IN_INTRQ#   88 88 128 128   VIDEO_OUT_R3 3   8   8   48 48
2   VIDEO_IN_SFL   89 89 129 129   VIDEO_OUT_R4 3   9   9   49 49
                         90 90 130 130   VIDEO_OUT_R5 3   3 UART_RX   10 10 50 50
                         91 91 131 131   11 11 51 51
3   VIDEO_OUT_SYNC#   92 92 132 132   VIDEO_OUT_R6 3   3 UART_TX   12 12 52 52
3   VIDEO_OUT_BLANK#   93 93 133 133   VIDEO_OUT_R7 3   13 13 53 53
3   VIDEO_OUT_G7   94 94 134 134   DIPSW2_4   14 14 54 54
3   VIDEO_OUT_G6   95 95 135 135   DIPSW2_3   15 15 55 55
                         96 96 136 136   16 16 56 56
3   VIDEO_OUT_G5   97 97 137 137   DIPSW2_2   17 17 57 57
3   VIDEO_OUT_G4   98 98 138 138   DIPSW2_1   18 18 58 58
3   VIDEO_OUT_G3   99 99 139 139   PB2   19 19 59 59
3   VIDEO_OUT_G2   100 100 140 140   PB1   20 20 60 60
                        101 101 141 141   21 21 61 61
3   VIDEO_OUT_G1   102 102 142 142   PB3   22 22 62 62   VIDEO_IN_PWDN# 2
3   VIDEO_OUT_G0   103 103 143 143   VIDEO_IN_RESET# 2   23 23 63 63   VIDEO_IN_P0   2
3   VIDEO_OUT_B3   104 104 144 144   VIDEO_IN_ASLB   2   24 24 64 64   VIDEO_IN_P1   2
3   VIDEO_OUT_B2   105 105 145 145   VIDEO_IN_SDA   2   25 25 65 65   VIDEO_IN_P2   2
                        106 106 146 146   26 26 66 66
3   VIDEO_OUT_B1   107 107 147 147   VIDEO_IN_SCLK   2   27 27 67 67   VIDEO_IN_P3   2
3   VIDEO_OUT_B0   108 108 148 148   28 28 68 68   VIDEO_IN_P11 2
3   VIDEO_OUT_B4   109 109 149 149   VIDEO_IN_P19   2   29 29 69 69   VIDEO_IN_P10 2
3   VIDEO_OUT_B5   110 110 150 150   VIDEO_IN_P18   2   LED3   30 30 70 70   VIDEO_IN_P9   2
                        111 111 151 151   LED2   31 31 71 71
3   VIDEO_OUT_B6   112 112 152 152   SLOT4_VRN   LED1   32 32 72 72   VIDEO_IN_P8   2
3   VIDEO_OUT_B7   113 113 153 153   SLOT2_VRP   33 33 73 73   VIDEO_IN_LLC1_FPGA 5
3   VIDEO_OUT_PCLK   114 114 154 154   SLOT2_VRN   34 34 74 74   VIDEO_IN_LLC2 2
                        115 115 155 155   VIDEO_IN_P17   2   35 35 75 75   VIDEO_IN_P4   2
    DIPSW_1   116 116 156 156   36 36 76 76
    DIPSW_2   117 117 157 157   VIDEO_IN_P16   2   37 37 77 77   VIDEO_IN_P5   2
    DIPSW_3   118 118 158 158   VIDEO_IN_OE#   2   38 38 78 78   VIDEO_IN_P6   2
    DIPSW_4   119 119 159 159   VIDEO_IN_FIELD   2   39 39 79 79   VIDEO_IN_P7   2
                        120 120 160 160   40 40 80 80

        GND   CONN160-HIROSE   GND   GND   CONN160-HIROSE   GND

DVDD_3.3v   PB1   DVDD_3.3v
                                                          SW3
          1   C43 0.1uF   5   4   DIPSW2_4
   SW1   6   3   DIPSW2_3
          2   R15 1k   PB2   7   2   DIPSW2_2
                            C58 0.1uF   8   1   DIPSW2_1
   SW2   2   R21 1k   PB3   SW DIP-4
          1   C62 0.1uF
   SW4   2   R36 1k   R38 1k
                    GND   R35 1k
                                                 R32 1k
                                                 R30 1k
                                                      GND

                             LED1   AVDD_3.3v
                             LED2
                             LED3   SW5   DVDD_3.3v   DVDD_3.3v
                                                 5   4   DIPSW_4   SLOT3_VRP R9 50 1%   SLOT1_VRP R8 50 1%
   R3   R4   R2   6   3   DIPSW_3   SLOT3_VRN   SLOT1_VRN
   110   91   100   7   2   DIPSW_2   R7 50 1%   R10 50 1%
   D1   D2   D3   8   1   DIPSW_1   GND   GND
                                             SW DIP-4
                                                                           DVDD_3.3v   DVDD_3.3v
                                                 R55 1k   SLOT4_VRP R29 50 1%   SLOT2_VRP R34 50 1%
  LED_RED LED_GREEN LED_YLLW   R57 1k   SLOT4_VRN   SLOT2_VRN
   GND   R56 1k   R31 50 1%   R37 50 1%
                                                 R39 1k   GND   GND
                                                      GND

Rice University

Title
TAP Video Daughtercard

Description   Rev
FPGA Board Headers & User I/O   x1

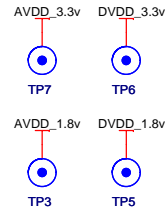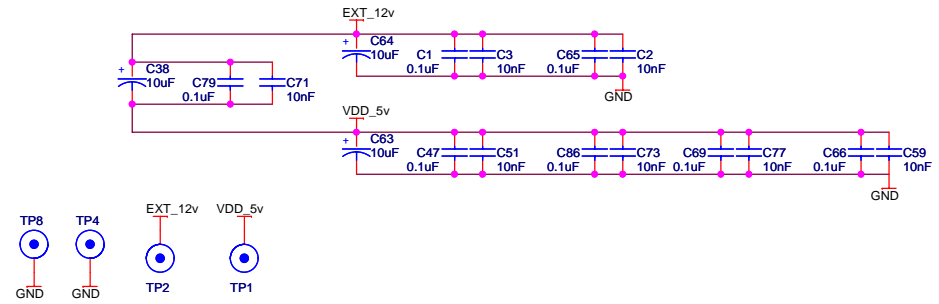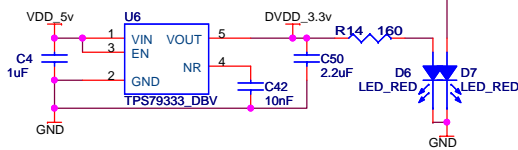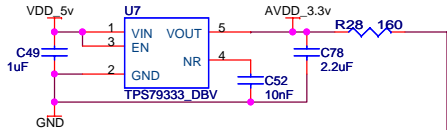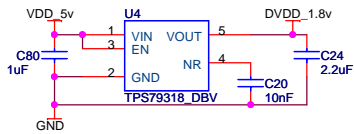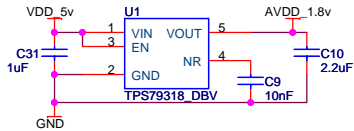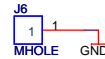Date: Monday, June 20, 2005   Sheet   5   of   5