



ADV7181C EVALUATION NOTE

EVAL-ADV7181CEB ADV7181C Video Decoder Evaluation Boards

Rev. A

November 2008

Table of Contents

Introduction.....	2
Evaluation Kit.....	2
Initial Configuration.....	2
Register Control Software.....	2
Configuring ADV7181C Modes Using Script Files.....	3
Board Level Description.....	5
Schematics.....	6
Layout Information.....	11
Layout Diagrams.....	11
Recommendations for Layout and Signal Routing.....	15
BOM.....	16
List of Figures.....	21
List of Tables.....	21

Introduction

This application note provides application support for the ADV7181C evaluation boards. It contains a description of the evaluation kit and the evaluation board, and provides details on the setup and configuration of the evaluation board.

Evaluation Kit

Each ADV7181C evaluation kit consists of the following:

- ADV7181C Evaluation Board
- ADV7181C Evaluation Kit CD
- I²C download cable with USB port connector
- 7 V DC Power Supply Module

Initial Configuration

Register Control Software

1. Install the Register Control software from the evaluation CD. (Refer to the Installation Guide on the evaluation CD for step-by-step instructions.)
2. Once the software is installed, power up the board and connect the USB connector.
3. Start the application (Start>Program>ADVREGISTER CONTROL >ADVREGISTER CONTROL 3.56).

The ADV Register Program Configuration screen appears, as shown in Figure 1.

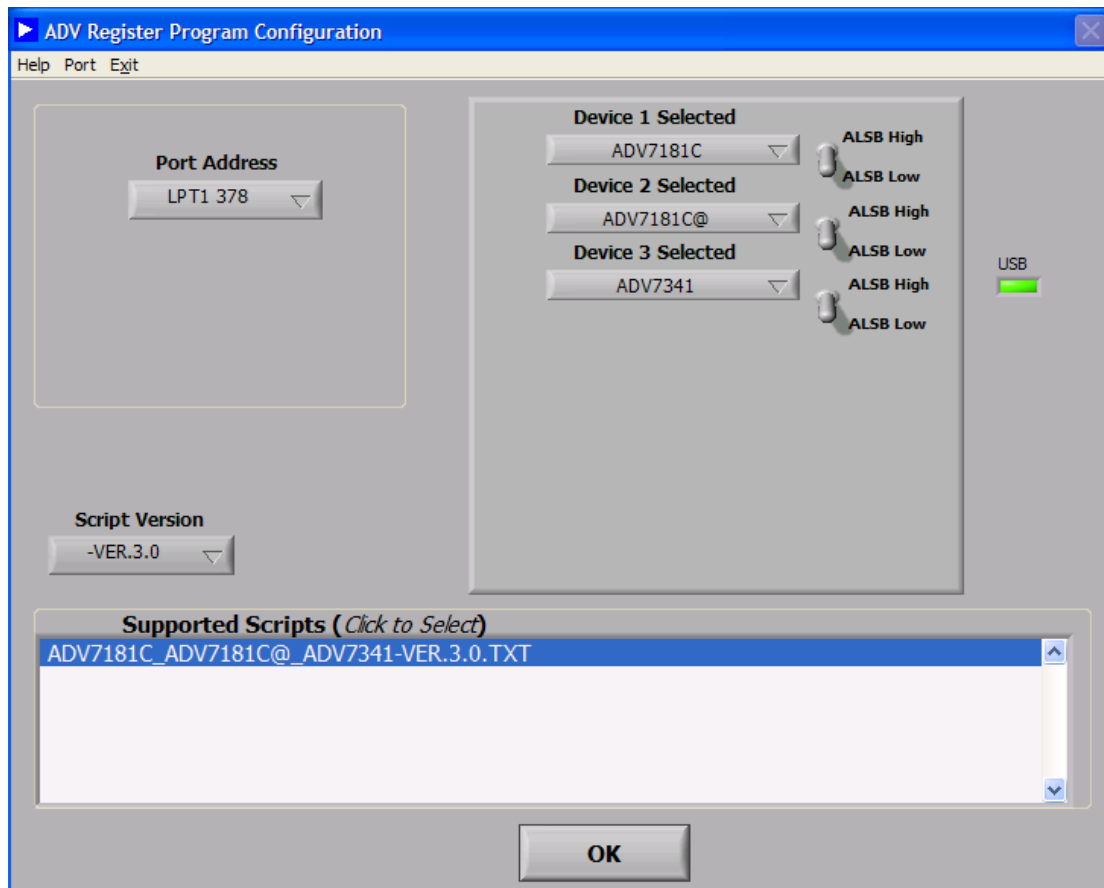


Figure 1. ADV Register Software Configuration

4. Ensure the options are set as shown in Figure 1, and click on the OK button. When the register control software starts, it firstly initializes all the selected devices and then loads the reset defaults for each device. I²C control and reset signals are connected to the evaluation board through the USB cable. This cable should be connected to the evaluation board before the application software is started.

Configuring ADV7181C Modes Using Script Files

To enable easy and efficient evaluation, the ADV Register Control software is provided with script files that can be used to program the evaluation board's decoder and encoder into preset configurations. Figure 2 illustrates how a script file can be accessed and selected from the drop down menu.

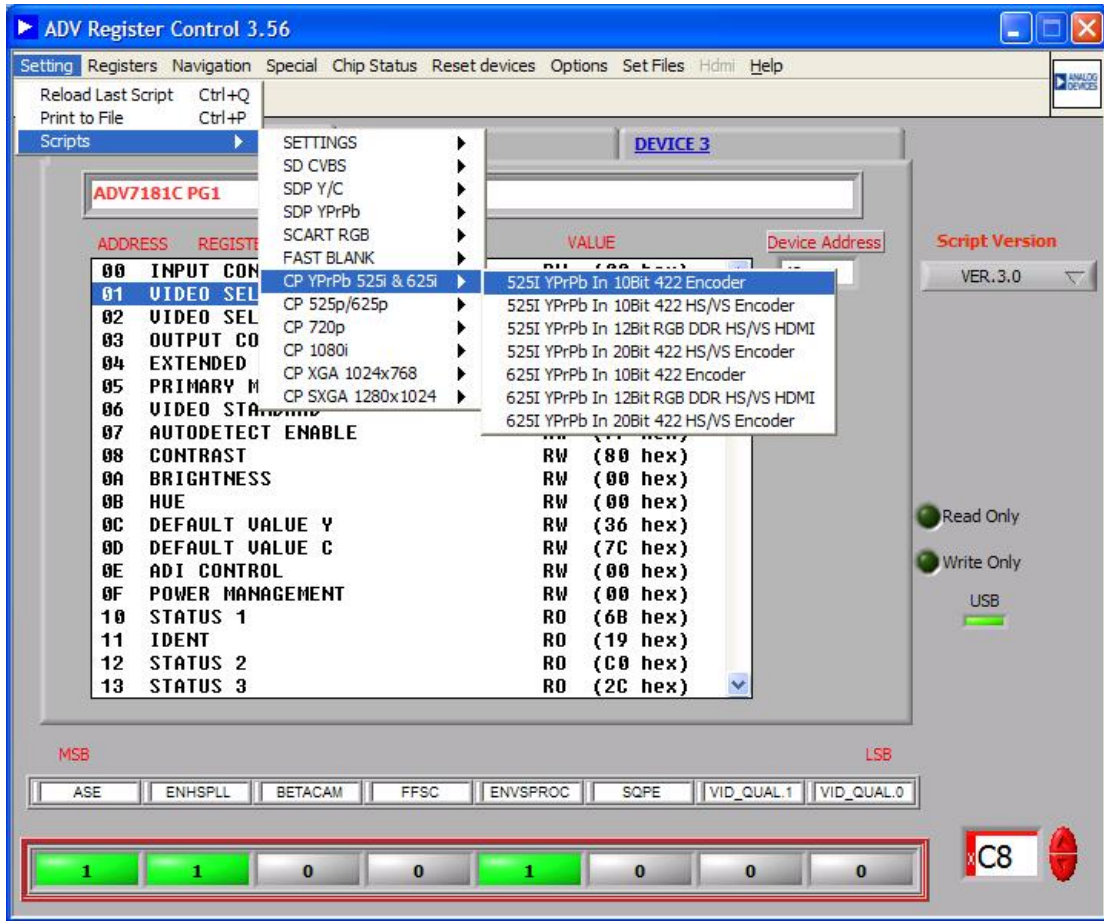


Figure 2. Configuration of ADV7181C with ADV Register Control Software

Board Level Description

This section provides details of the ADV7181C evaluation board's schematics, layout, and BOM. The primary features of the boards and their positions are marked in Figure 3.

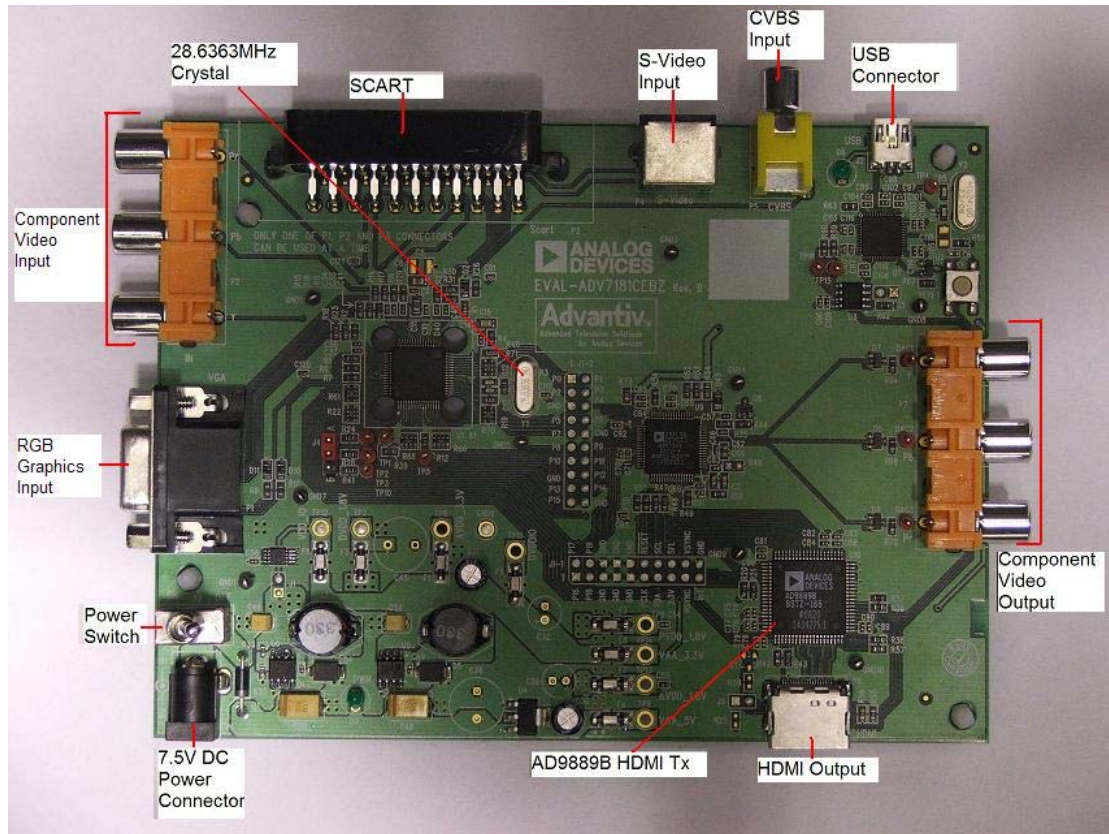


Figure 3. EVAL-ADV7181C Evaluation Board

Schematics

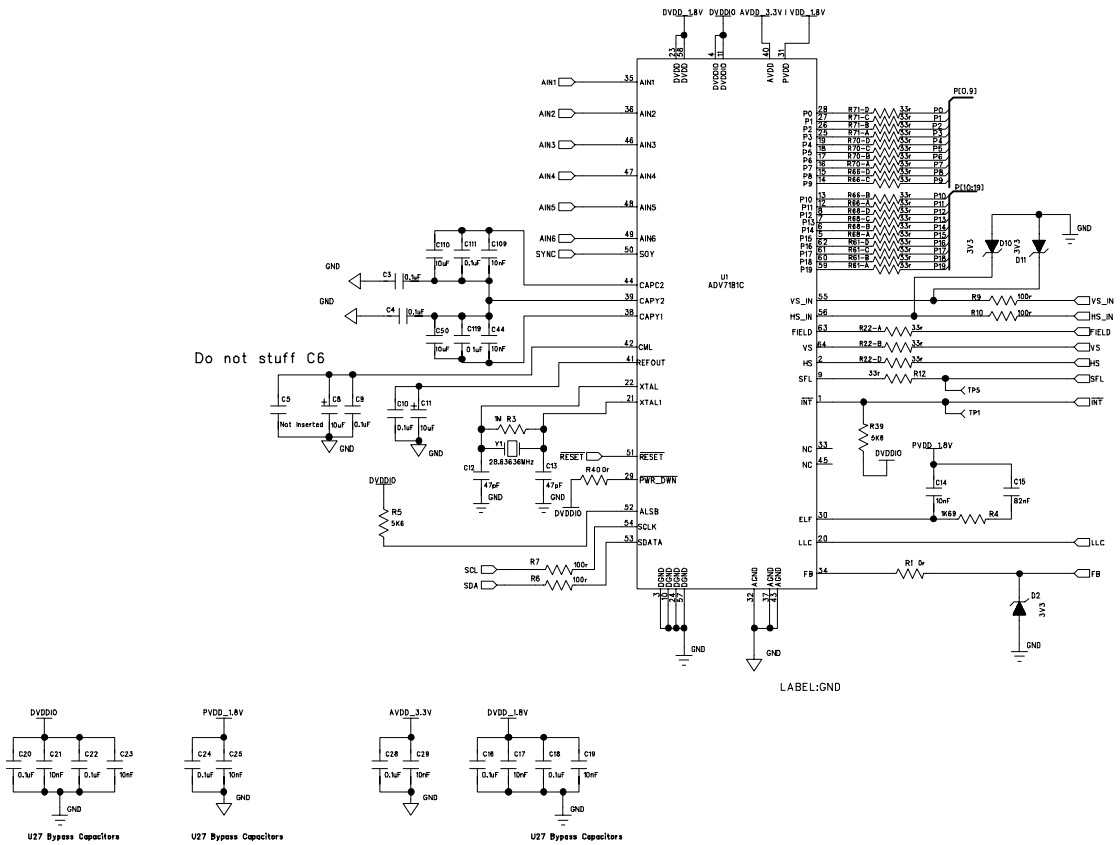


Figure 4. ADV7181C Evaluation Board Schematic – Decoder Section

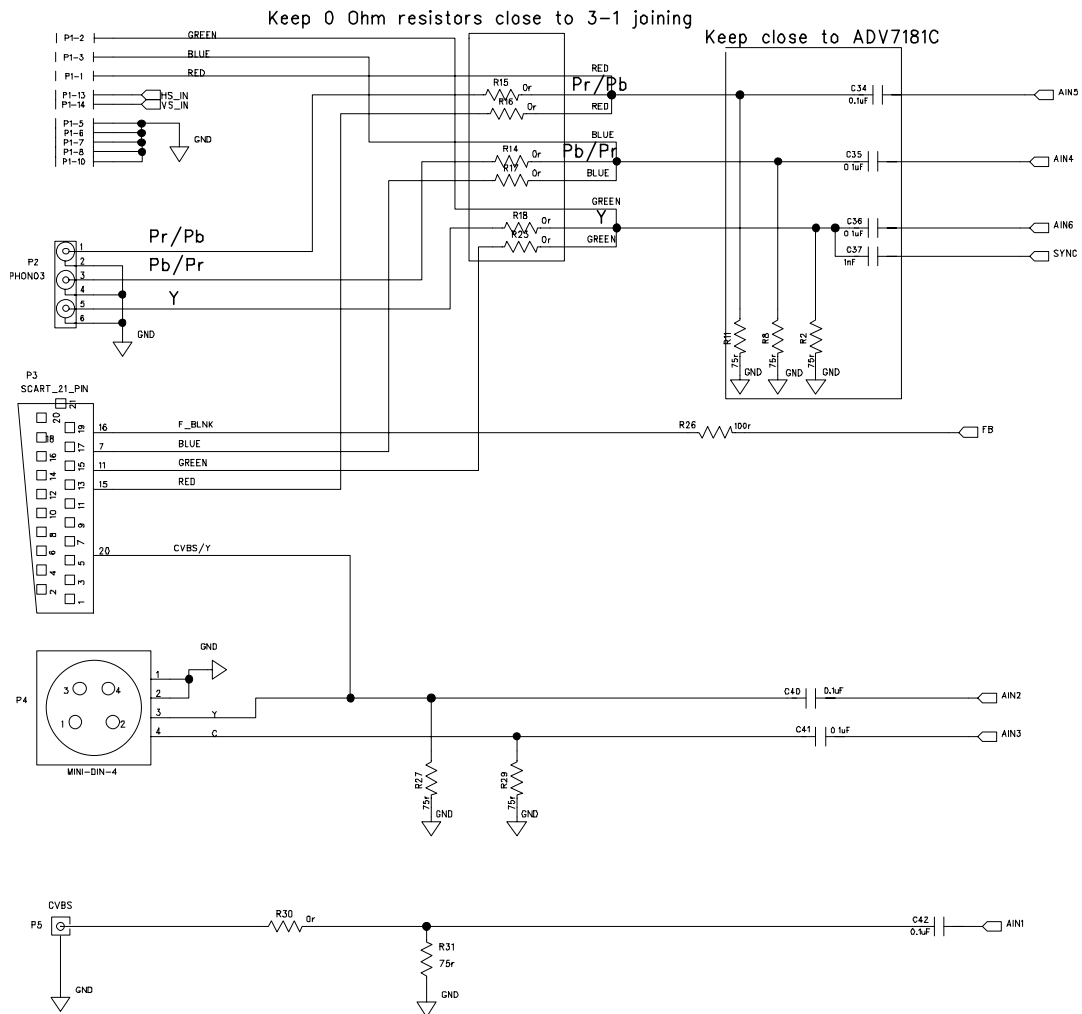


Figure 5. ADV7181C Evaluation Board Schematic – Analog Input Stage

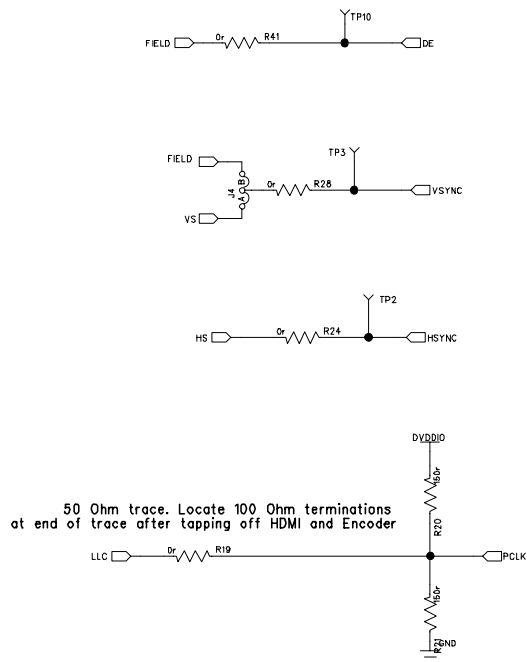


Figure 6. ADV7181C Evaluation Board Schematic – Decoder Output Block

Output Header

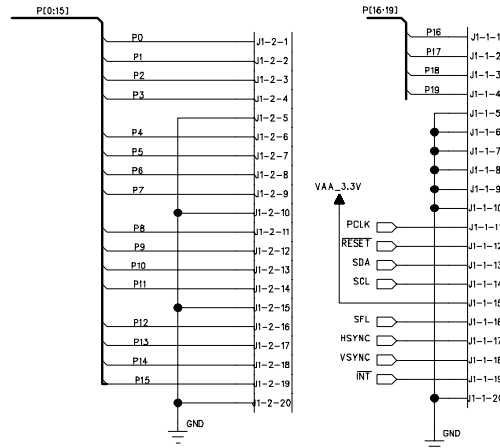


Figure 7. ADV7181C Evaluation Board Schematic – Header

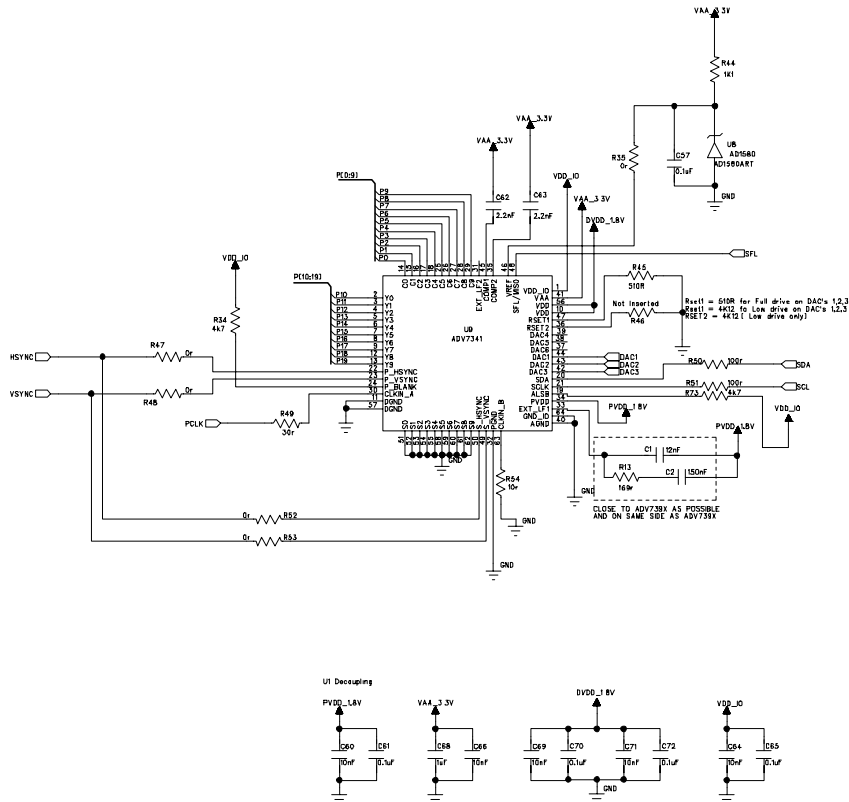


Figure 8. ADV7181C Evaluation Board Schematic – ADV7341 Encoder

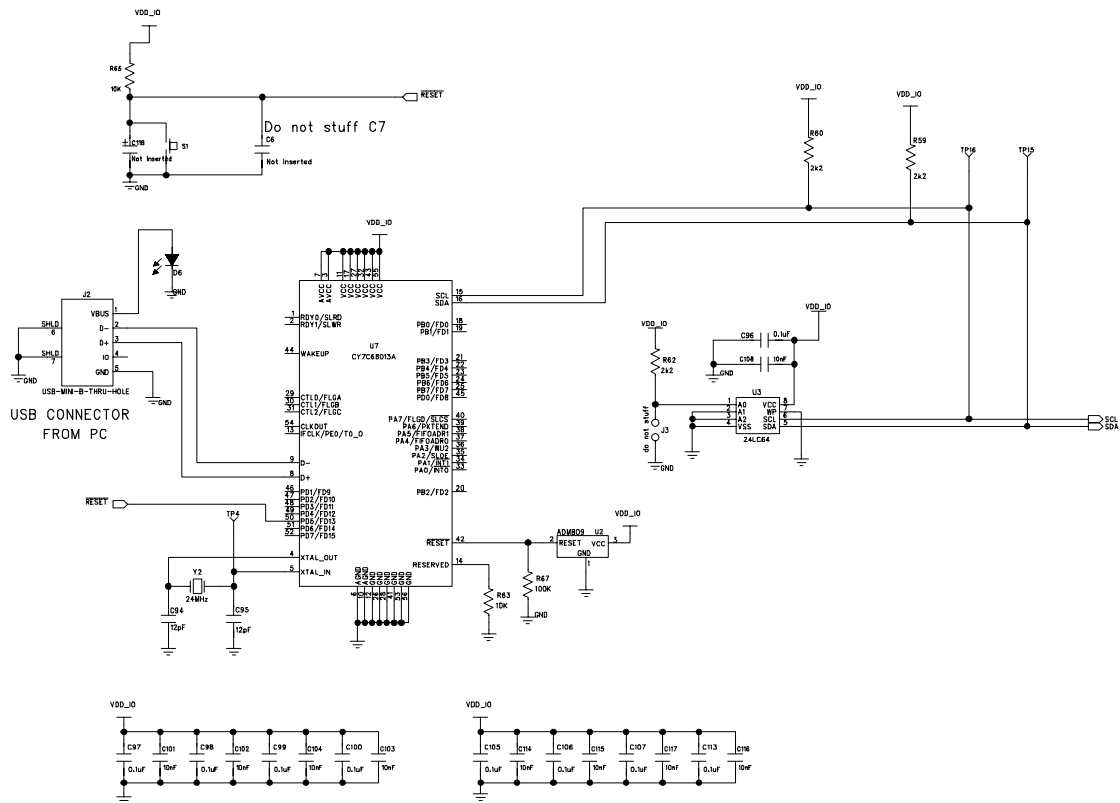


Figure 11. ADV7181C Evaluation Board Schematic – I²C Interface

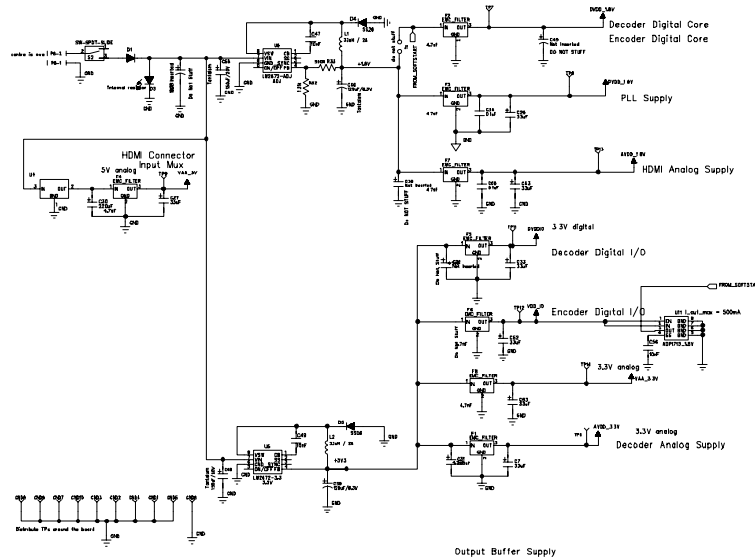


Figure 12. ADV7181C Evaluation Board Schematic – PSU

Layout Information

Layout Diagrams

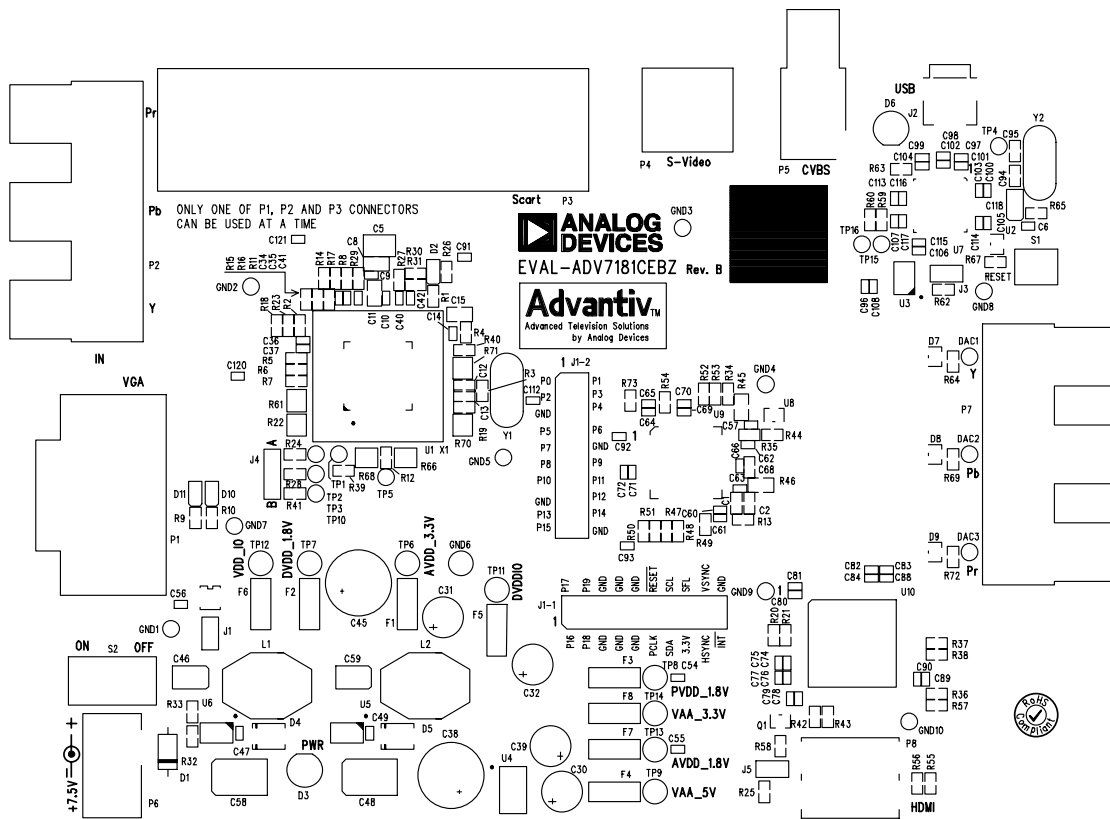


Figure 13. ADV7181C Evaluation Board Layout – Silkscreen Primary Side

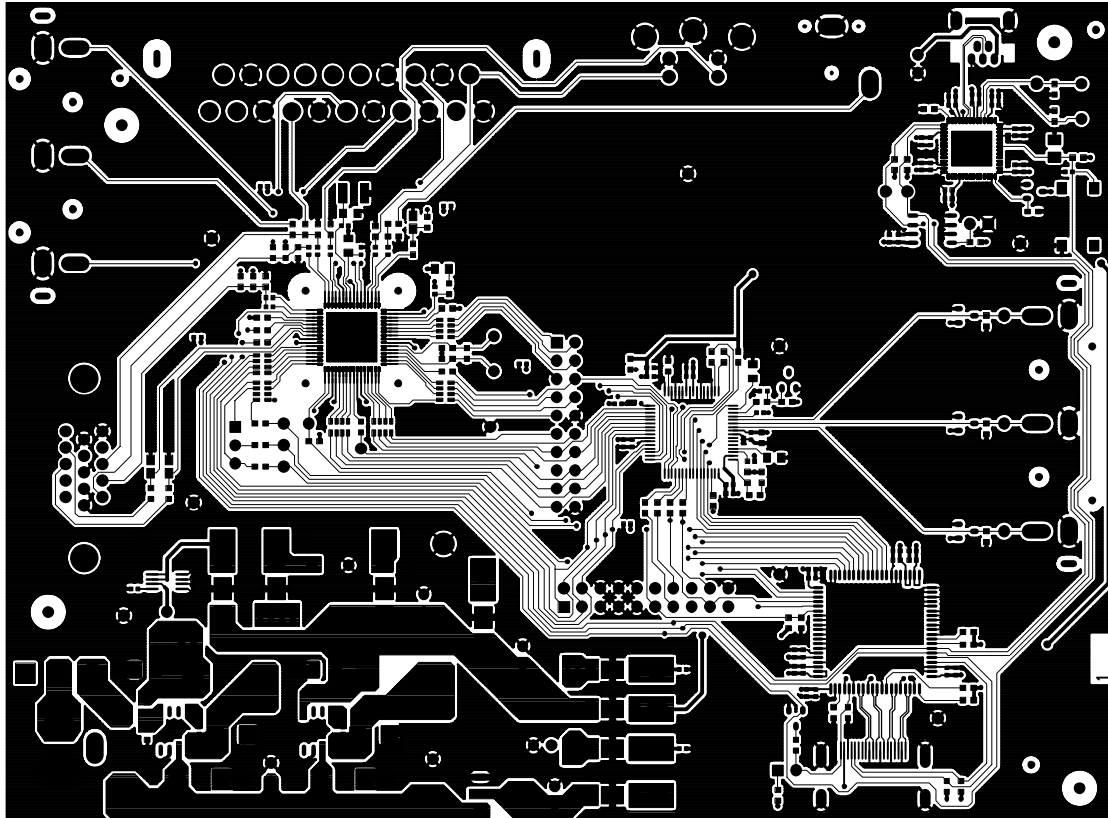


Figure 14. ADV7181C Evaluation Board Layout – Primary Side Layer 1

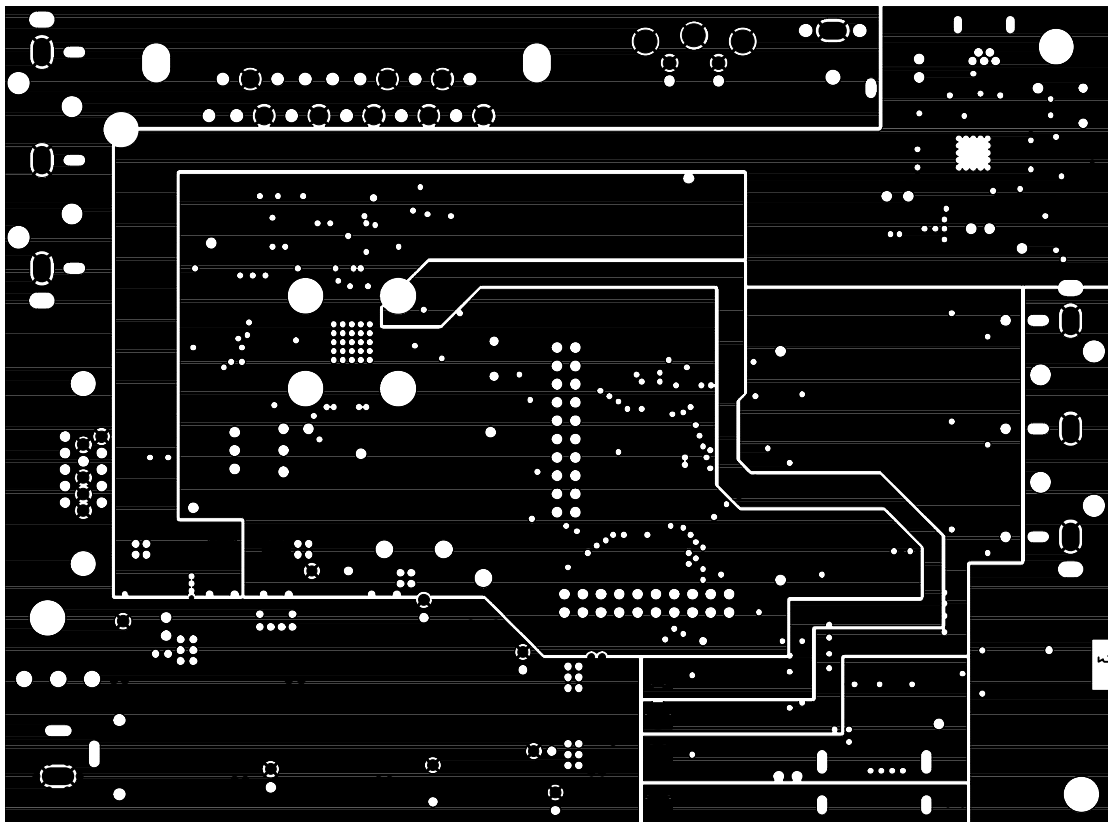


Figure 15. ADV7181C Evaluation Board Layout – Primary Side Layer 2

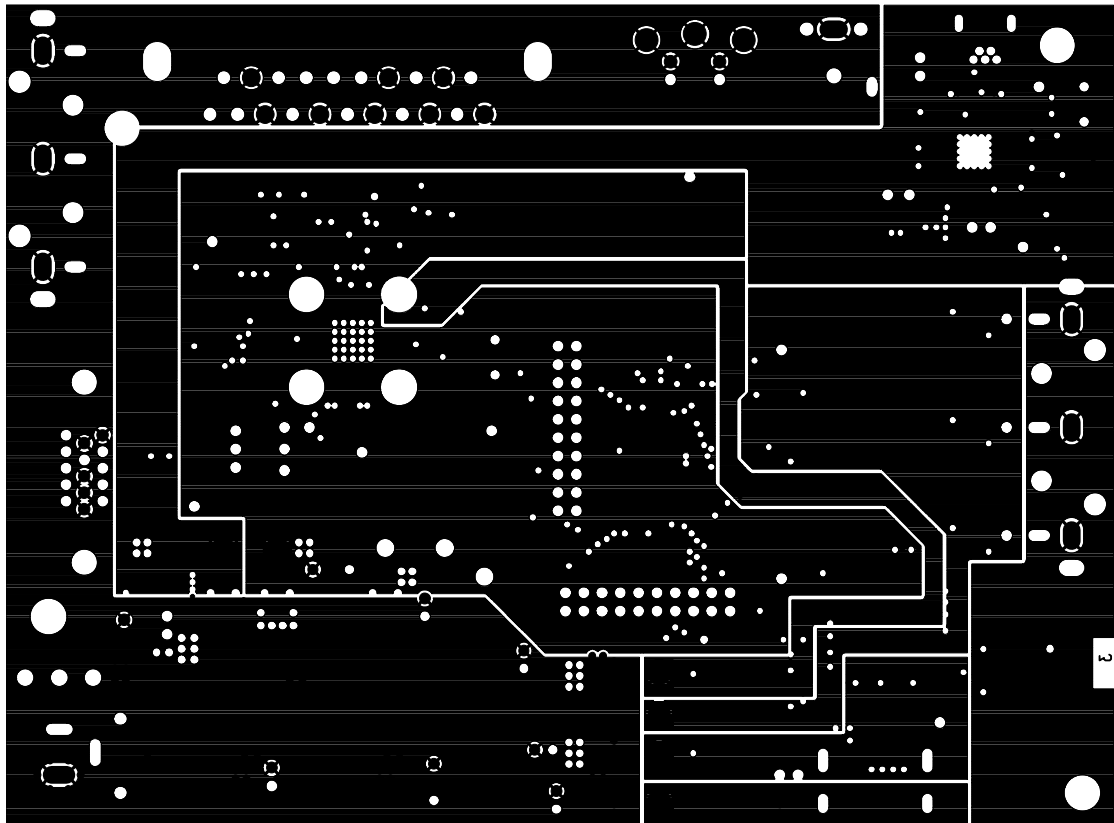


Figure 16. ADV7181C Evaluation Board Layout – Primary Side Layer 3

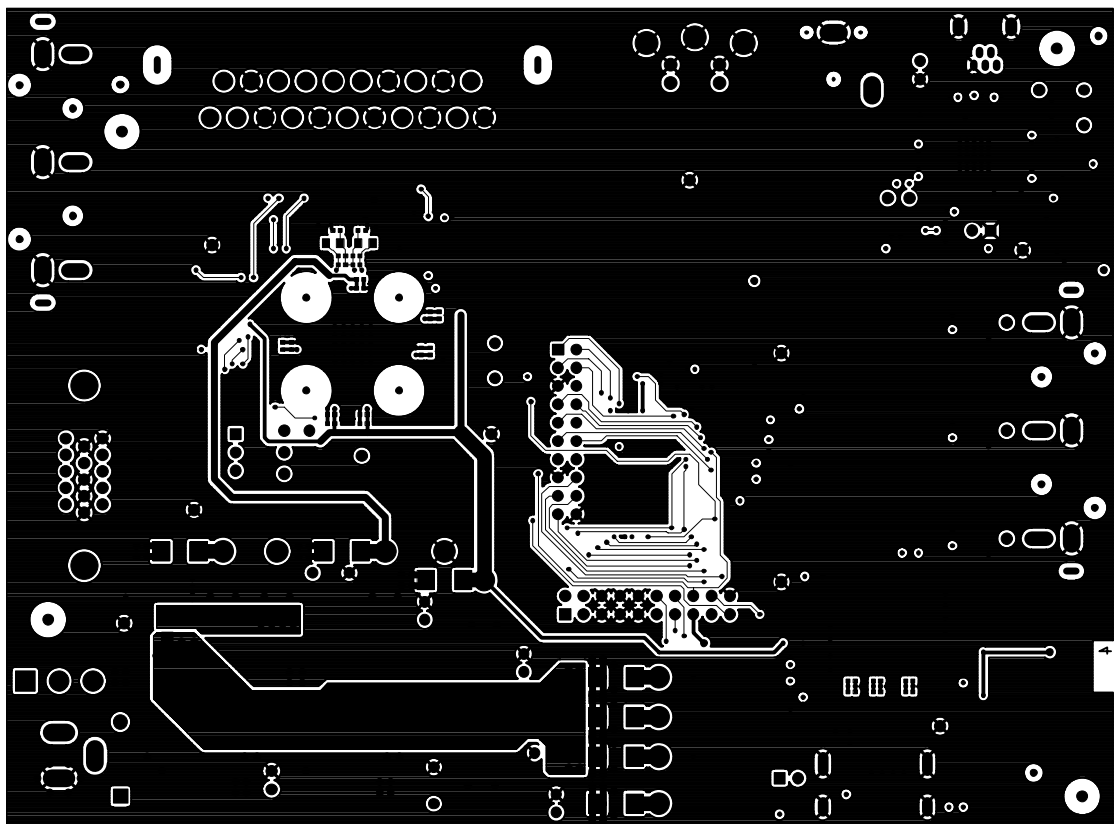


Figure 17. ADV7181C Evaluation Board Layout – Primary Side Layer 4

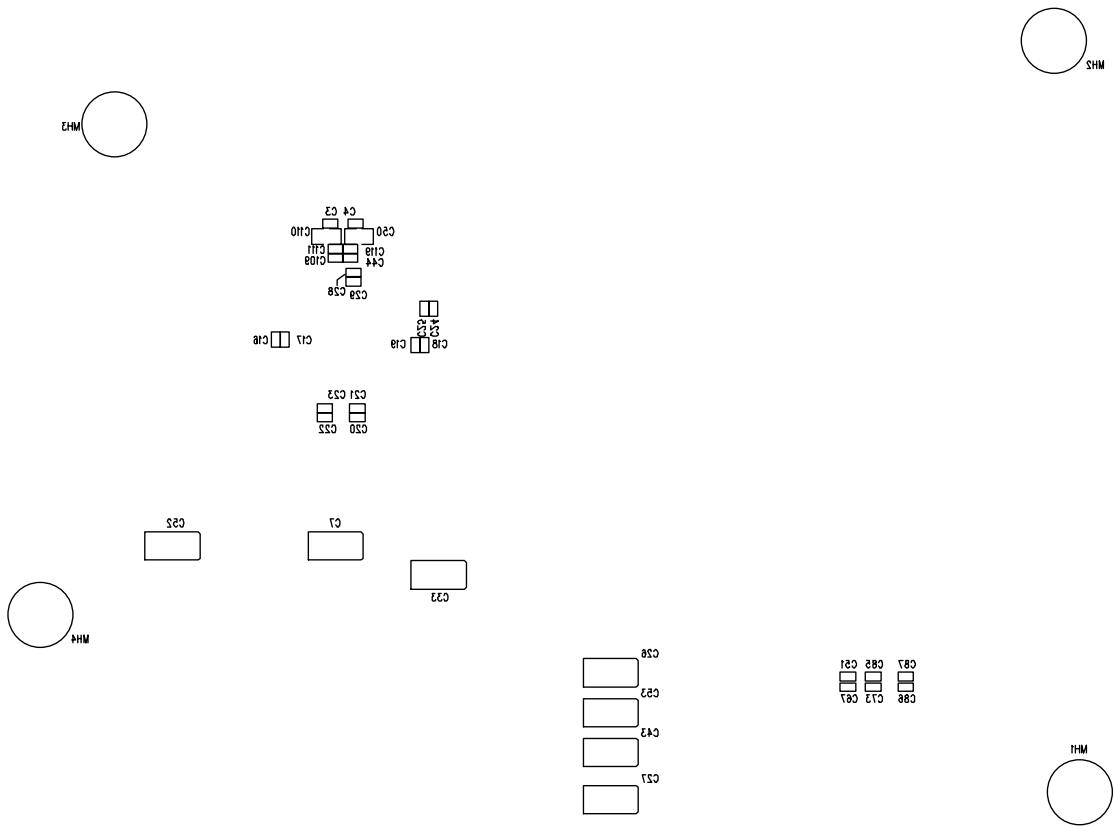


Figure 18. ADV7181C Evaluation Board Layout – Silkscreen Secondary Side

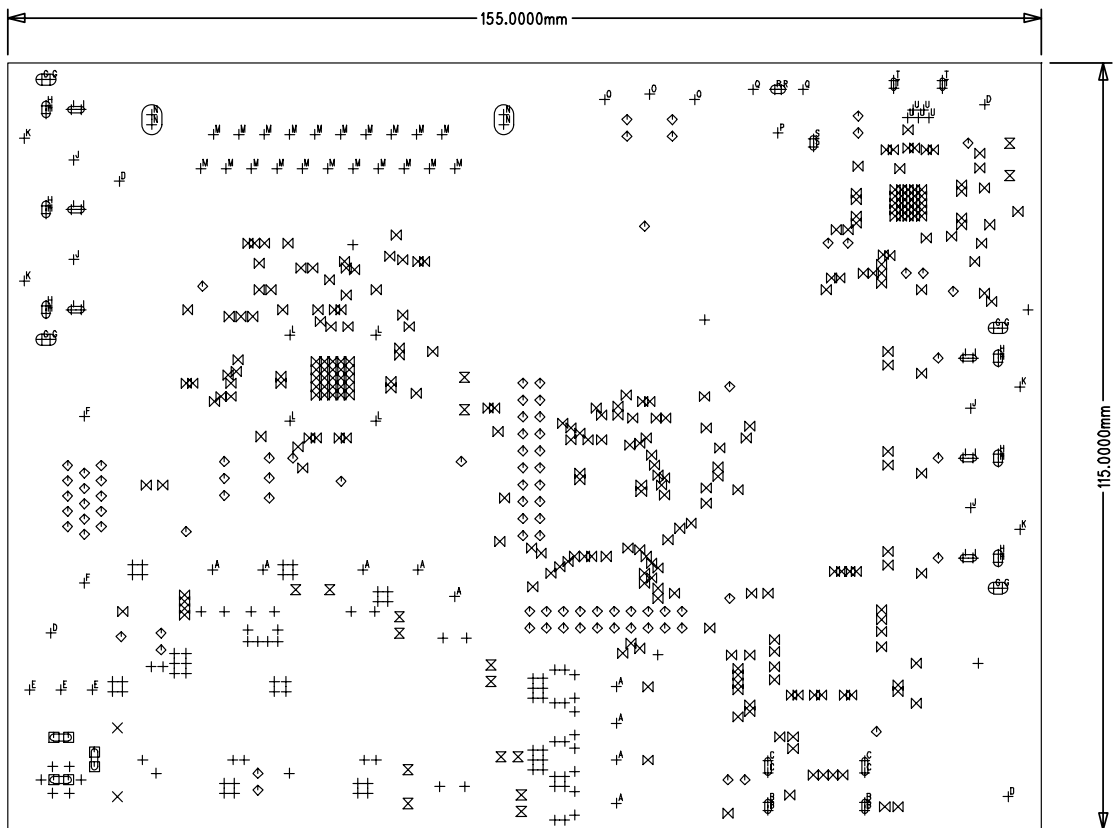


Figure 19. ADV7181C Evaluation Board Layout – Primary Side Drill Legend

Recommendations for Layout and Signal Routing

- Position the decoupling caps as close as possible to the pins. Since the power and ground pins are beside each other, lay the caps across them at the pin. Position the lower value cap closer to the chip, where possible.

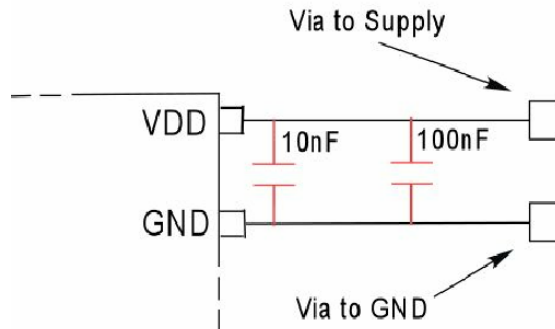


Figure 20. Decoupling Caps Layout Recommendation

- Locate the series resistors as close as possible to the DUT. Minimise the track length and ensure that they are placed on the same layer as the DUT.
- Ensure that track traces are controlled to 75 Ω impedance.
- LLC signal routing is critical:
 - Place the LLC resistor right at the pin on Layer 4.
 - Route the LLC directly to the Layer 4 via. When on Layer 4, the LLC is shielded on both sides by ground planes and above by the power plane.
- Graphics RGB routing:
 - Ensure all track lengths are equal
 - Minimize the track lengths from input to part
 - Recommend using ferrite bead filters
 - Use ground isolation between signals

BOM

Table 1. EVAL-ADV7181CLQE BOM

Name	Part Type	Value	Tolerance	PCB Decal
C1	CAP	12nF	±10%	C0603
C2	CAP	150nF	±10%	C0603
C3	CAP	0.1uF	(+80 -20%)	C0402
C4	CAP	0.1uF	(+80 -20%)	C0402
C7	CAP+	33uF	±10%	RTAJ_C
C8	CAP+	10uF	±10%	C0805
C9	CAP	0.1uF	(+80 -20%)	C0402
C10	CAP	0.1uF	(+80 -20%)	C0402
C11	CAP+	10uF	±10%	C0805
C12	CAP	47pF	±5%	C0603
C13	CAP	47pF	±5%	C0603
C14	CAP	10nF	(+80 -20%)	C0402
C15	CAP	82nF	±10%	C0805
C16	CAP	0.1uF	(+80 -20%)	C0402
C17	CAP	10nF	(+80 -20%)	C0402
C18	CAP	0.1uF	(+80 -20%)	C0402
C19	CAP	10nF	(+80 -20%)	C0402
C20	CAP	0.1uF	(+80 -20%)	C0402
C21	CAP	10nF	(+80 -20%)	C0402
C22	CAP	0.1uF	(+80 -20%)	C0402
C23	CAP	10nF	(+80 -20%)	C0402
C24	CAP	0.1uF	(+80 -20%)	C0402
C25	CAP	10nF	(+80 -20%)	C0402
C26	CAP+	33uF	±10%	RTAJ_C
C27	CAP+	33uF	±10%	RTAJ_C
C28	CAP	0.1uF	(+80 -20%)	C0402
C29	CAP	10nF	(+80 -20%)	C0402
C30	CAP-ELE_RAD	220uF	±20%	DCAP\SR21
C31	CAP-ELE_RAD	220uF	±20%	DCAP\SR21
C33	CAP+	33uF	±10%	RTAJ_C
C34	CAP	0.1uF	(+80 -20%)	C0402
C35	CAP	0.1uF	(+80 -20%)	C0402
C36	CAP	0.1uF	(+80 -20%)	C0402
C37	CAP	1nF	±10%	C0402
C40	CAP	0.1uF	(+80 -20%)	C0402
C41	CAP	0.1uF	(+80 -20%)	C0402
C42	CAP	0.1uF	(+80 -20%)	C0402
C43	CAP+	33uF	±10%	RTAJ_C
C44	CAP	10nF	(+80 -20%)	C0402
C46	CAP+_ELEK	120uF/6.3V	±20%	RTAJ_B
C47	CAP	10nF	(+80 -20%)	C0402
C48	CAP+	150uF/20V	±10%	RTAJ_D-7343
C49	CAP	10nF	(+80 -20%)	C0402
C50	CAP	10uF	±10%	C0805
C51	CAP	10nF	(+80 -20%)	C0402
C52	CAP+	33uF	±10%	RTAJ_C
C53	CAP+	33uF	±10%	RTAJ_C
C54	CAP	0.1uF	(+80 -20%)	C0402
C55	CAP	0.1uF	(+80 -20%)	C0402
C56	CAP	10nF	(+80 -20%)	C0402
C57	CAP	0.1uF	(+80 -20%)	C0402
C58	CAP+	150uF/20V	±10%	RTAJ_D-7343
C59	CAP+_ELEK	120uF/6.3V	±20%	RTAJ_B

Table 2. EVAL-ADV7181CLQEB BOM (continued 1)

Name	Part Type	Value	Tolerance	PCB Decal
C60	CAP	10nF	(+80 -20%)	C0402
C61	CAP	0.1uF	(+80 -20%)	C0402
C62	CAP	2.2nF	±10%	C0402
C63	CAP	2.2nF	±10%	C0402
C64	CAP	10nF	(+80 -20%)	C0402
C65	CAP	0.1uF	(+80 -20%)	C0402
C66	CAP	10nF	(+80 -20%)	C0402
C67	CAP	0.1uF	(+80 -20%)	C0402
C68	CAP	1uF	(+80 -20%)	C0603
C69	CAP	10nF	(+80 -20%)	C0402
C70	CAP	0.1uF	(+80 -20%)	C0402
C71	CAP	10nF	(+80 -20%)	C0402
C72	CAP	0.1uF	(+80 -20%)	C0402
C73	CAP	0.1uF	(+80 -20%)	C0402
C74	CAP	10nF	(+80 -20%)	C0402
C75	CAP	0.1uF	(+80 -20%)	C0402
C76	CAP	10nF	(+80 -20%)	C0402
C77	CAP	0.1uF	(+80 -20%)	C0402
C78	CAP	10nF	(+80 -20%)	C0402
C79	CAP	0.1uF	(+80 -20%)	C0402
C80	CAP	10nF	(+80 -20%)	C0402
C81	CAP	0.1uF	(+80 -20%)	C0402
C82	CAP	0.1uF	(+80 -20%)	C0402
C83	CAP	0.1uF	(+80 -20%)	C0402
C84	CAP	10nF	(+80 -20%)	C0402
C85	CAP	10nF	(+80 -20%)	C0402
C86	CAP	0.1uF	(+80 -20%)	C0402
C87	CAP	10nF	(+80 -20%)	C0402
C88	CAP	10nF	(+80 -20%)	C0402
C89	CAP	0.1uF	(+80 -20%)	C0402
C90	CAP	10nF	(+80 -20%)	C0402
C91	CAP	220pF	±10%	C0402
C92	CAP	220pF	±10%	C0402
C93	CAP	220pF	±10%	C0402
C94	CAP	12pF	±5%	C0603
C95	CAP	12pF	±5%	C0603
C96	CAP	0.1uF	(+80 -20%)	C0402
C97	CAP	0.1uF	(+80 -20%)	C0402
C98	CAP	0.1uF	(+80 -20%)	C0402
C99	CAP	0.1uF	(+80 -20%)	C0402
C100	CAP	0.1uF	(+80 -20%)	C0402
C101	CAP	10nF	(+80 -20%)	C0402
C102	CAP	10nF	(+80 -20%)	C0402
C103	CAP	10nF	(+80 -20%)	C0402
C104	CAP	10nF	(+80 -20%)	C0402
C105	CAP	0.1uF	(+80 -20%)	C0402
C106	CAP	0.1uF	(+80 -20%)	C0402
C107	CAP	0.1uF	(+80 -20%)	C0402
C108	CAP	10nF	(+80 -20%)	C0402
C109	CAP	10nF	(+80 -20%)	C0402
C110	CAP	10uF	±10%	C0805
C111	CAP	0.1uF	(+80 -20%)	C0402
C112	CAP	220pF	±10%	C0402
C113	CAP	0.1uF	(+80 -20%)	C0402
C114	CAP	10nF	(+80 -20%)	C0402
C115	CAP	10nF	(+80 -20%)	C0402
C116	CAP	10nF	(+80 -20%)	C0402
C117	CAP	10nF	(+80 -20%)	C0402
C119	CAP	0.1uF	(+80 -20%)	C0402
C120	CAP	220pF	±10%	C0402
C121	CAP	220pF	±10%	C0402

Table 3. EVAL-ADV7181CLQEB BOM (continued 2)

Name	Part Type	Value	Tolerance	PCB Decal
D1	DIODE			DO41
D2	ZENER-DIODE	3V3		SOD-110
D3	LED			LED
D4	DIODE	SS26		DO-214A
D5	DIODE	SS26		DO-214A
D6	LED			LED
D7	BAT54S			RSOT23
D8	BAT54S			RSOT23
D9	BAT54S			RSOT23
D10	ZENER-DIODE	3V3		SOD-110
D11	ZENER-DIODE	3V3		SOD-110
DAC1	TESTPOINT			TESTPOINT
DAC2	TESTPOINT			TESTPOINT
DAC3	TESTPOINT			TESTPOINT
F1	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F2	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F3	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F4	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F5	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F6	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F7	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
F8	EMC_FILTER	4.7nF	(+80 -20%)	EMC_FILTER
GND1	TESTPOINT			TESTPOINT
GND2	TESTPOINT			TESTPOINT
GND3	TESTPOINT			TESTPOINT
GND4	TESTPOINT			TESTPOINT
GND5	TESTPOINT			TESTPOINT
GND7	TESTPOINT			TESTPOINT
GND8	TESTPOINT			TESTPOINT
GND9	TESTPOINT			TESTPOINT
GND10	TESTPOINT			TESTPOINT
J2	USB-MINI-B-THRU-HOLE			USB-MINI-B-THRU-HOLE
J4	JUMPER2\SIP3			LINK-3P_TEXT_INV
L1	PM3340	33uH / 2A	±20%	PM3340
L2	PM3340	33uH / 2A	±20%	PM3340
MH1	4MM_HEX_STANDOFF			SELFLOCK_4MM_HEX_STANDOFF
MH2	4MM_HEX_STANDOFF			SELFLOCK_4MM_HEX_STANDOFF
MH3	4MM_HEX_STANDOFF			SELFLOCK_4MM_HEX_STANDOFF
MH4	4MM_HEX_STANDOFF			SELFLOCK_4MM_HEX_STANDOFF
P1	DCON15HF-HI-D			DCON15HF-HI-DENS
P2	PHONO3			PHONO3
P3	SCART_21_PIN			SCART
P4	MINI-DIN-4			MINI-DIN-4
P5	PH-CTP1-114			PH-CTP1-114
P6	CON-BARREL			CONBARREL
P7	PHONO3			PHONO3
P8	HDMI_19_PIN			HDMI-CON
R1	RES	0r	±1%	R0603
R2	RES	75r	±1%	R0603
R3	RES	1M	±1%	R0603
R4	RES	1K69	±1%	R0603
R5	RES	5K6	±1%	R0603
R6	RES	100r	±1%	R0603
R7	RES	100r	±1%	R0603
R8	RES	75r	±1%	R0603
R9	RES	100r	±1%	R0603
R10	RES	100r	±1%	R0603
R11	RES	75r	±1%	R0603
R12	RES	33r	±5%	R0603
R13	RES	169r	±1%	R0603

Table 4. EVAL-ADV7181CLQEB BOM (continued 3)

Name	Part Type	Value	Tolerance	PCB Decal
R14	RES	0r	±1%	R0603
R15	RES	0r	±1%	R0603
R16	RES	0r	±1%	R0603
R17	RES	0r	±1%	R0603
R18	RES	0r	±1%	R0603
R19	RES	0r	±1%	R0603
R20	RES	150r	±1%	R0603
R21	RES	150r	±1%	R0603
R22	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R23	RES	0r	±1%	R0603
R24	RES	0r	±1%	R0603
R26	RES	100r	±1%	R0603
R27	RES	75r	±1%	R0603
R28	RES	0r	±1%	R0603
R29	RES	75r	±1%	R0603
R30	RES	0r	±1%	R0603
R31	RES	75r	±1%	R0603
R32	RES	1.21k	±1%	R0603
R33	RES	590R	±1%	R0603
R34	RES	4k7	±1%	R0603
R35	RES	0r	±1%	R0603
R36	RES	4k7	±1%	R0603
R37	RES	2K	±1%	R0603
R38	RES	2K	±1%	R0603
R39	RES	5K6	±1%	R0603
R40	RES	0r	±1%	R0603
R41	RES	0r	±1%	R0603
R42	RES	887R	±1%	R0603
R43	RES	49k	±1%	R0603
R44	RES	1K1	±1%	R0603
R45	RES	510R	±1%	R0805
R47	RES	0R	±1%	R0603
R48	RES	0R	±1%	R0603
R49	RES	30r	±1%	R0603
R50	RES	100R	±1%	R0603
R51	RES	100R	±1%	R0603
R52	RES	0R	±1%	R0603
R53	RES	0R	±1%	R0603
R54	RES	10r	±1%	R0603
R55	RES	330R	±1%	R0603
R56	RES	330R	±1%	R0603
R57	RES	4k7	±1%	R0603
R59	RES	2k2	±1%	R0603
R60	RES	2k2	±1%	R0603
R61	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R62	RES	2k2	±1%	R0603
R63	RES	10K	±1%	R0603
R64	RES	75R	±1%	R0603
R65	RES	10K	±1%	R0603
R66	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R67	RES	100K	±1%	R0603
R68	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R69	RES	75R	±1%	R0603
R70	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R71	RES_PACK_SMD_4	33r	±5%	RESPACK_EXB38V
R72	RES	75R	±1%	R0603
R73	RES	4k7	±1%	R0603
S1	SW-PUSH-SMD			SW_PB_SMD_6MM
S2	SW-SPDT-SLIDE			SW-2M1-SP3

Table 5. EVAL-ADV7181CLQEB BOM (continued 4)

Name	Part Type	Value	Tolerance	PCB Decal
TP1	TESTPOINT			TESTPOINT
TP2	TESTPOINT			TESTPOINT
TP3	TESTPOINT			TESTPOINT
TP4	TESTPOINT			TESTPOINT
TP5	TESTPOINT			TESTPOINT
TP6	TESTPOINT			TESTPOINT-POWER
TP7	TESTPOINT			TESTPOINT-POWER
TP8	TESTPOINT			TESTPOINT-POWER
TP9	TESTPOINT			TESTPOINT-POWER
TP10	TESTPOINT			TESTPOINT
TP11	TESTPOINT			TESTPOINT-POWER
TP12	TESTPOINT			TESTPOINT-POWER
TP13	TESTPOINT			TESTPOINT-POWER
TP14	TESTPOINT			TESTPOINT-POWER
TP15	TESTPOINT			TESTPOINT
TP16	TESTPOINT			TESTPOINT
U1	ADV7181C			LQFP-64
U2	ADM809			RSOT23-3
U3	24LC64			SO8NB
U4	ADP3338-5V			SOT223
U5	LM2672-3.3	3.3V	n/a	SO8NB
U6	LM2672-ADJ	ADJ	n/a	SO8NB
U7	CY7C68013A	n/a		LFCSP-56_RP
U8	AD1580	AD1580ART		RSOT23-3
U9	ADV7341			LQFP64
U10	AD9889			LQFP80-65MM-PITCH
U11	ADP1715_1.8V			MSO8-IPC
X1	CLAMP-10MM			CLAMP-10MM
Y1	XTAL1	28.63636MHz		HC49
Y2	XTAL1	24MHz		HC49

List of Figures

Figure 1. ADV Register Software Configuration	3
Figure 2. Configuration of ADV7181C with ADV Register Control Software	4
Figure 3. EVAL-ADV7181C Evaluation Board.....	5
Figure 4. ADV7181C Evaluation Board Schematic – Decoder Section	6
Figure 5. ADV7181C Evaluation Board Schematic – Analog Input Stage.....	7
Figure 6. ADV7181C Evaluation Board Schematic – Decoder Output Block.....	7
Figure 7. ADV7181C Evaluation Board Schematic – Header	8
Figure 8. ADV7181C Evaluation Board Schematic – ADV7341 Encoder.....	8
Figure 9. ADV7181C Evaluation Board Schematic – Component Output	9
Figure 10. ADV7181C Evaluation Board Schematic – HDMI Output	9
Figure 11. ADV7181C Evaluation Board Schematic – I ² C Interface	10
Figure 12. ADV7181C Evaluation Board Schematic – PSU	10
Figure 13. ADV7181C Evaluation Board Layout – Silkscreen Primary Side	11
Figure 14. ADV7181C Evaluation Board Layout – Primary Side Layer 1.....	12
Figure 15. ADV7181C Evaluation Board Layout – Primary Side Layer 2.....	12
Figure 16. ADV7181C Evaluation Board Layout – Primary Side Layer 3.....	13
Figure 17. ADV7181C Evaluation Board Layout – Primary Side Layer 4.....	13
Figure 18. ADV7181C Evaluation Board Layout – Silkscreen Secondary Side	14
Figure 19. ADV7181C Evaluation Board Layout – Primary Side Drill Legend	14
Figure 20. Decoupling Caps Layout Recommendation.....	15

List of Tables

Table 1. EVAL-ADV7181CLQEB BOM.....	16
Table 2. EVAL-ADV7181CLQEB BOM (continued 1)	17
Table 3. EVAL-ADV7181CLQEB BOM (continued 2)	18
Table 4. EVAL-ADV7181CLQEB BOM (continued 3)	19
Table 5. EVAL-ADV7181CLQEB BOM (continued 4)	20