# DS90UR907Q-EVK
# FPD-Link to FPD-Link II Converter
# Evaluation Kit

Rev 0.1
April, 2010

## General Description

The DS90UR907Q-EVK converts FPD-link to FPD-Link II. It translates four LVDS data/control streams and one LVDS clock pair into a high-speed serialized interface over a single pair. It is backward compatible for operation with older generation deserializer devices.

The DS90UR907Q-EVK board has a space saving 20-position wall header as the FPD-Link input, and a Rosenberger Automotive HSD Connector as the output. USB or SMA connectors can also be configured as the output, based on the type of the cable to be used.

## Features

- 5 – 65 MHz support (140 Mbps to 1.82 Gbps Serial Link)
- 5-channel (4 data + 1 clock) FPD-Link receiver inputs
- AC Coupled STP Interconnect up to 10 meters in length
- Integrated output termination
- @ Speed link BIST Mode and reporting pin
- Optional I2C compatible Serial Control Bus
- RGB888 + VS, HS, DE serialized to 1 pair
- Power down Mode minimizes power dissipation
- Randomizer/Scrambler – DC-balanced data stream
- Low EMI FPD-Link input
- Selectable output VOD and adjustable de-emphasis
- 1.8V or 3.3V compatible control bus interface
- Automotive grade product: AEC-Q100 Grade 2 qualified
- >8 kV HBM and ISO 10605 ESD rating
- Backward compatible mode for operation with older generation devices

## Applications

- Automotive Displays for Navigation
- Automotive Display for Entertainment

## Ordering Information

**PART:** DS90UR907QSQ
**Demo board:** DS90UR907Q-EVK



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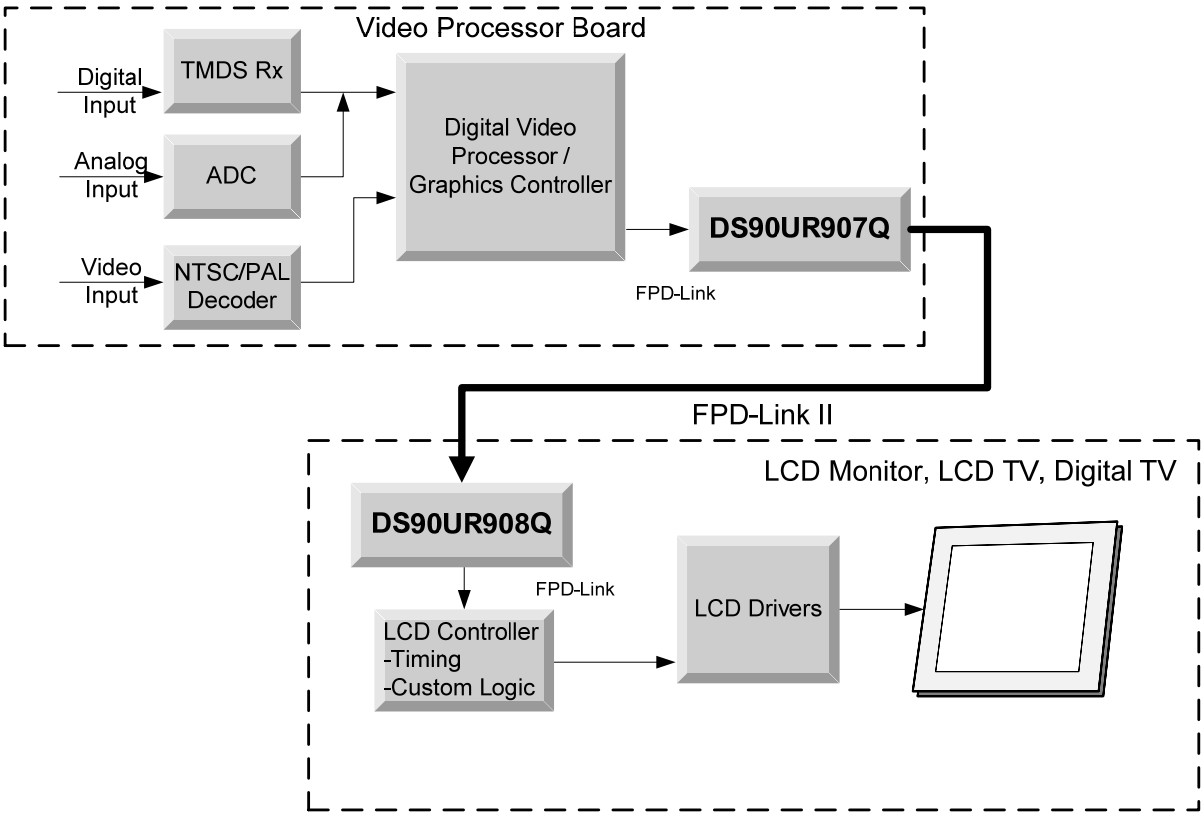
## Typical Configuration




## Quick Start Guide:

1. Connect 3.3V DC power and ground of the board to the JP1 from the power supply. Connect 1.8V DC power and ground of the board to the J3 and J4 from the power supply.
2. Attach an applicable cable (not supplied) to this TX board (DS90UR907Q) output to an RX board (DS90UR908Q) input.
3. From the Video Decoder board, connect a flat cable (not supplied) to this TX board and connect another flat cable (not supplied) from the RX board to the panel.
4. Jumpers and switches have been configured at the factory; they should not require any changes for immediate operation of the board. See text on Configuration Settings and datasheet for more details.



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## Configuration Settings

| Component | Name | Function |
|---|---|---|
| **Power Connections** | | |
| J3 | 1.8V DC | 1.8V VDD Power. |
| JP1 | 3.3V DC | 3.3V VDD Power. |
| J4 | VSS | Ground. |
| JP2 | VDDI | Always connect to 3.3V. |
| JP18 | VDDL | Always connect to 1.8V. |
| JP23 | VDDP | Always connect to 1.8V. |
| JP24 | VDDHS | Always connect to 1.8V. |
| **Input and Output Connections** | | |
| J1 | 20 position wall header | Connect to FPD-Link input. |
| P1 | Automotive HSD Connector | Connect to FPD-Link II output (default). |
| J7 and J8 | SMA Connectors | Connect to FPD-Link II output.<br>(When using these connectors, R8 and R9 should be placed with 0Ω resistors, the traces from R8 and R9 to the P1 should be cut). |
| P3 | USB Connector | Connect to FPD-Link II output.<br>(When using this connector, P1 should be removed, and R26 and R27 should be placed with 0Ω resistors). |
| JP25 and JP26 | Power Wire in USB cable through P3 | Connect to VSS is recommended. |
| **Control Connections** | | |
| JP4 | MAPSEL | Connect it to “L” or “H” for the FPD Link mapping select. See datasheet for detail information. |
| JP5 | TESTEN | NSC test mode. Always connect it to “L” or leave it unconnected. |
| JP6 | PDB | Connect it to “L” for the power down mode. Connect it to “H” for the enable mode.<br>See datasheet for detail information. |
| JP7 | BISTEN | Connect it to “H” for the BIST enable mode. See datasheet for detail information. |
| JP8 | VODSEL | Connect it to “L” or “H” for the FPD-Link II VOD level select. See datasheet for detail information. |
| JP21 and JP22 | CONFIG | Configuration select. See datasheet for detail information. |
| JP17 and VR3 | DEEMPH | Leave JP17 unconnected to disable the FPD-Link II output de-emphasis feature.<br>Connect JP17, Adjust VR3 value to select de-emphasis level. |
| JP19 and VR4 | ID[x] | Connect JP19 to VSS to have the default device PHY address (h’EC).<br>Connect JP19 to VR4; then adjust VR4 value to select desired device PHY address. See datasheet for detail information. |
| JP3 and J6 | I2C Interface | Connect JP3 if the I2C power is not supplied on J6. Otherwise, leave it unconnected. |



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## Bill of Material

| Item | Quantity | Reference | Comments | Digi-key P/N | Part number |
|---|---|---|---|---|---|
| 1 | 2 | C1,C13 | CAPACITOR TANT 2.2UF 20V 10% SMD | 399-3714-1-ND | T491B225K020AT |
| 2 | 2 | C2,C14 | CAP .10UF 50V CERAMIC X7R 1206 | 399-1249-1-ND | C1206C104K5RACTU |
| 3 | 4 | C3,C4,C7,C8 | CAP TANTALUM 10UF 16V 20% SMD. Optional. | 493-2365-1-ND | F931C106MBA_open |
| 4 | 2 | C5,C6 | CAP CERAMIC .1UF25V X5R 0402 | 445-4964-1-ND | C1005X5R1E104K |
| 5 | 2 | C9,C12 | CAP TANTALUM 22UF 25V 20% SMD | 493-2391-1-ND | F931E226MNC |
| 6 | 2 | C10,C11 | CAP CERAMIC 5.0PF 25V NP0 0201 | PCC2107CT-ND | ECJ-ZEC1E050C |
| 7 | 7 | C15,C20,C23,C24,C27,C30, C32 | CAP .1UF ±10% 25V CERAMIC X7R 0603 | PCC2277CT-ND | ECJ-1VB1E104K |
| 8 | 7 | C16,C17,C18,C19,C28,C33, C34 | CAPACITOR TANT 22UF 16V 20% SMD | 399-3835-1-ND | T494B226M016AT |
| 9 | 6 | C21,C22,C25,C26,C29,C31 | CAP CERAMIC .01UF 100V X7R 0603 | 399-3189-1-ND | C0603C103K1RACTU |
| 10 | 3 | JP1,JP3,JP17 | CONN HEADER VERT .100 2POS 30AU | A26542-ND | 87220-2 |
| 11 | 14 | JP2,JP4,JP5,JP6,JP7,JP8, JP18,JP19,JP21,JP22,JP23, JP24,JP25,JP26 | CONN HEADER VERT .100 3POS 15AU | A26545-ND | 87224-3 |
| 12 | 1 | J1 | CONN HEADER 20 POS STRGHT GOLD. | MHC20K-ND | N2520-6002RB |
| 13 | 1 | J2 | CONN POWER JACK 2.1MM. Optional. | CP-002A-ND_open | PJ-002A_open |
| 14 | 2 | J3,J4 | BANANA-female (non-insulated) | J147-ND | 108-0740-001 |
| 15 | 1 | J5 | CONN HDR DUAL 8POS .100 SRT AU. Optional. | WM26808-ND | 10-89-7082_open |
| 16 | 1 | J6 | CONN HEADER 4POS .100 VERT GOLD | WM2702-ND | 22-11-2042 |
| 17 | 2 | J7,J8 | End Launch Jack Receptacle - Tab Contact. Optional. | J658-ND_open | 142-0701-851_open |
| 18 | 1 | P1 | Automotive HSD Conn - Right Angle Plug Optional. | | D4S20B-40ML5-Y_open |
| 19 | 1 | P2 | CONN RECEPT MINI USB2.0 5POS. Optional. | H2959CT-ND | UX60-MB-5ST_open |
| 20 | 1 | P3 | CONN USB RECEPT R/A TYPE A 4POS. | A31726-ND | 292303-1 |
| 21 | 1 | R1 | RES 1.50K OHM 1/16W 1% 0402 SMD | P1.50KLCT-ND | ERJ-2RKF1501X |
| 22 | 2 | R2,R12 | RES ZERO OHM 1/16W 5% 0402 SMD. Optional. | P0.0JTR-ND_open | ERJ-2GEJ0R00X_open |
| 23 | 5 | R3,R4,R5,R6,R7 | RES 100 OHM 0201 SMD. 1/20W .5% | RR03P100DCT-ND | RR0306P-101-D |
| 24 | 2 | R8,R9 | RES 0 OHM 0201 SMD. Optional. | P0.0AGCT-ND | ERJ-1GE0R00C |
| 25 | 1 | R10 | RES 100K OHM 1/10W 1% 0603 SMD. Optional. | P100KHCT-ND_open | ERJ-3EKF1003V_open |
| 26 | 1 | R11 | RES 10.0K OHM 1/10W 1% 0603 SMD | P10.0KHCT-ND | ERJ-3EKF1002V |
| 27 | 2 | R13,R14 | RES 4.7K OHM 1/10W 5% 0603 SMD | P4.7KGCT-ND | ERJ-3GEYJ472V |
| 28 | 2 | R15,R16 | RES 82.5 OHM 1/10W 1% 0603 SMD. Optional. | P82.5HCT-ND | ERJ-3EKF82R5V_open |
| 29 | 1 | R17 | RES 100 OHM 1/10W 1% 0603 SMD. Optional. | P100HCT-ND | ERJ-3EKF1000V_open |
| 30 | 7 | R18,R20,R21,R22,R23,R24, R25 | RES ZERO OHM 1/16W 5% 0402 SMD | P0.0JTR-ND | ERJ-2GEJ0R00X |
| 31 | 2 | R26,R27 | RES 0.0 OHM 1/20W 5% 0201 SMD | P0.0AGCT-ND | ERJ-1GE0R00C |
| 32 | 1 | U1 | DO NOT PURCHASE, National will supply. | | DS90UR907 |
| 33 | 2 | U2,U3 | IC REG ADJ 800MA LDO SOT-223. | LM1117IMP-ADJ/NOPB | LM1117IMP-ADJ/NOPB_open |
| 34 | 2 | VR1,VR2 | TRIMPOT 100 OHM 4MM TOP ADJ SMD. | 3214W-101ETR-ND | 3214W-1-101E_open |
| 35 | 1 | VR3 | 11-Turn Trimming Potentiometer; Top Adjust | 3224W-203ECT-ND | 3224W-1-203E |
| 36 | 1 | VR4 | 11-Turn Trimming Potentiometer; Top Adjust | 3224W-1-104ECT-ND | 3224W-1-104E |

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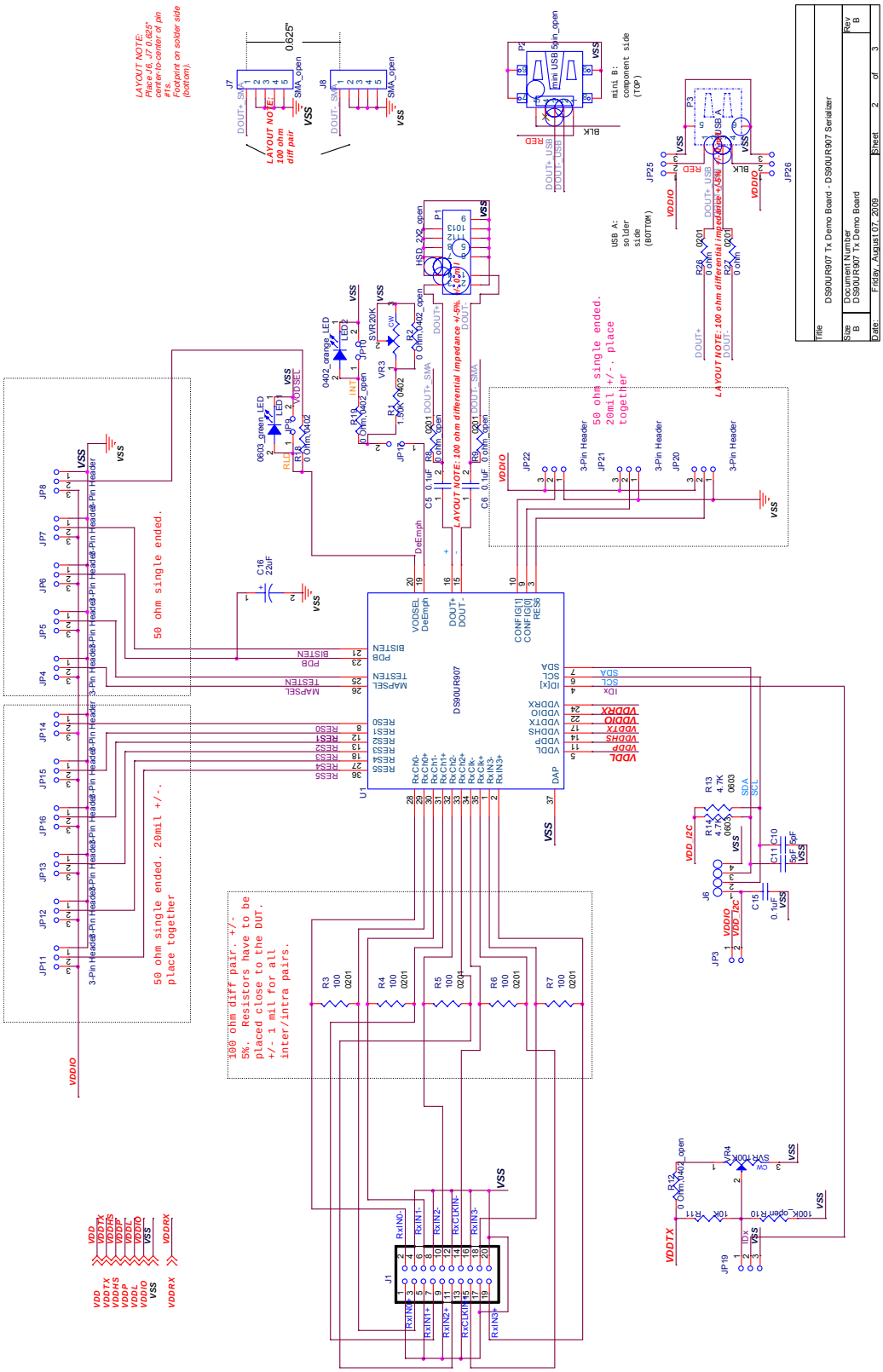
## Schematics



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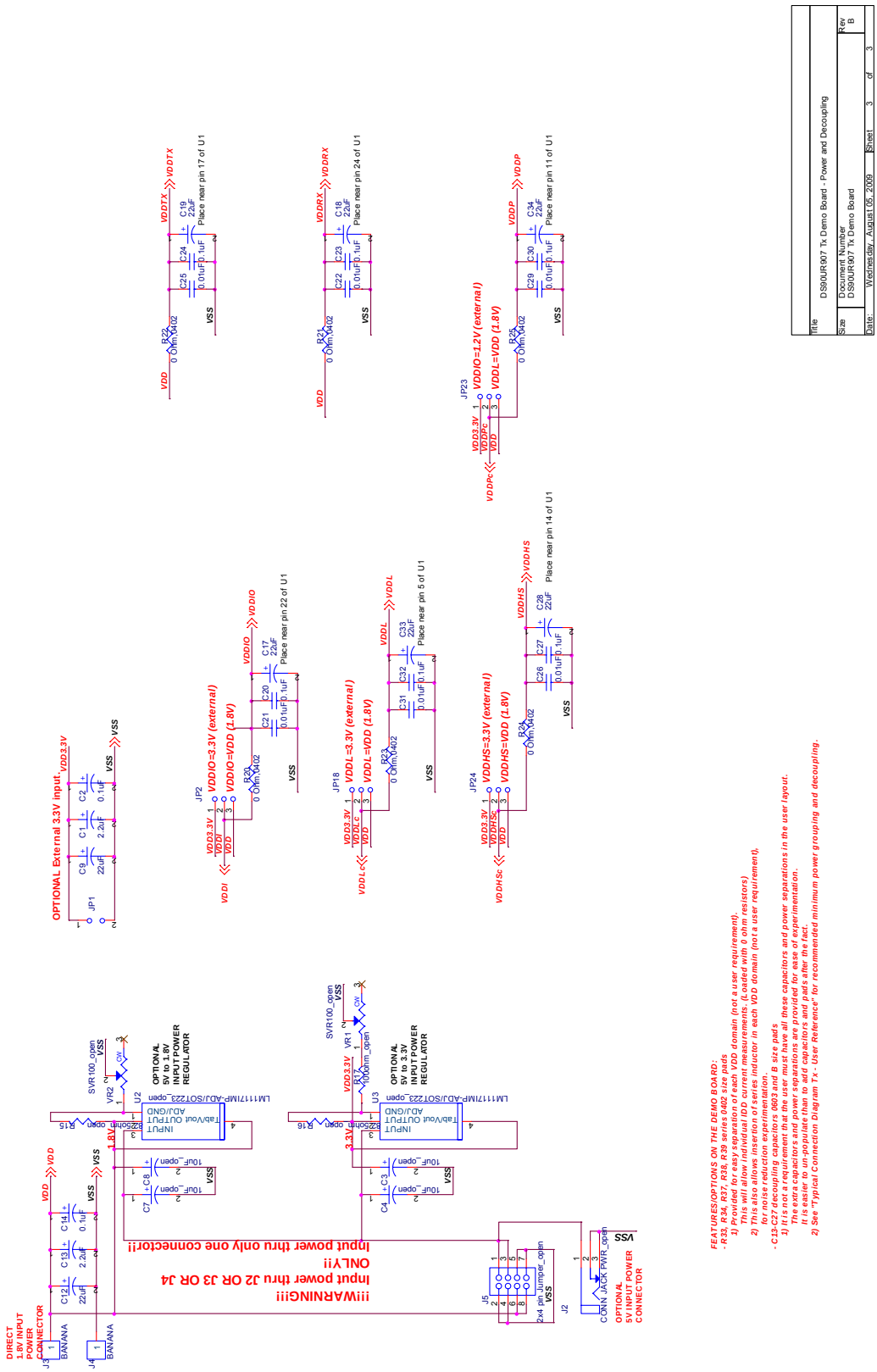




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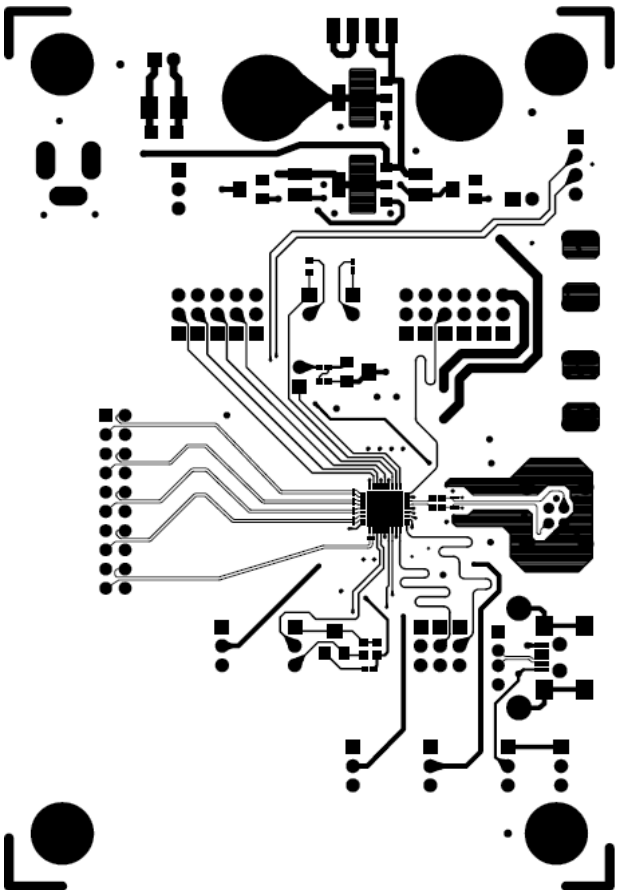
## Reference Layout



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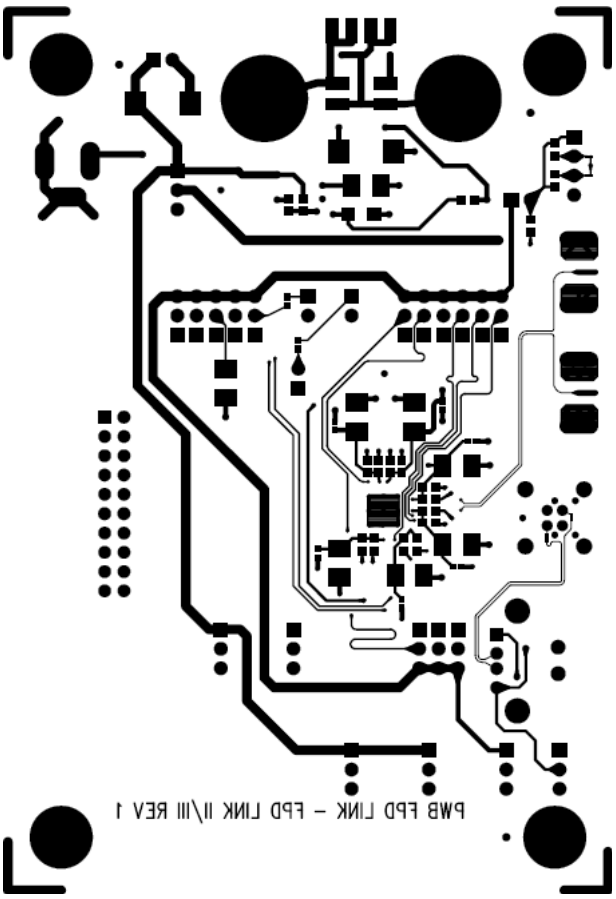


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