

RHADC-FMCEV1Z

The radiation hardened precision SAR ADC evaluation system enables the evaluation of the Renesas portfolio of low-power, high-performance Successive Approximate Register (SAR) Analog-to-Digital Converters (ADC). The evaluation system uses the iRADAnalyzer software, which displays all pertinent data such as SFDR, SINAD, ENOB, THD, harmonics, current, and power measurements. The software plots ADC output data in frequency spectra and time domain. Data can be saved from the software in from either domain.

To ensure proper operation of the system, Renesas recommends that the most current software version is installed. If iRADAnalyzer is already installed on the machine, a new installation can proceed without removing the prior version.

Key Features

- Complete measurement solution for radiation hardened precision SAR ADCs
- Works with iRADAnalyzer to support datasheet-style, live-updated display with calculation of critical ADC parameters (SNR, SFDR, SINAD, ENOB, Harmonics, Power)
- Supports most Vita 57.1 FPGA Mezzanine Connector (FMC) specifications

Specifications

- Data rates between 1ksps and 1000ksps
- USB 2.0 interface for rapid data transfer
- 32k - 1M word capture depth
- Components supporting commercial temperature range of -40°C to +85°C
- Power supplied by single 5V DC wall supply

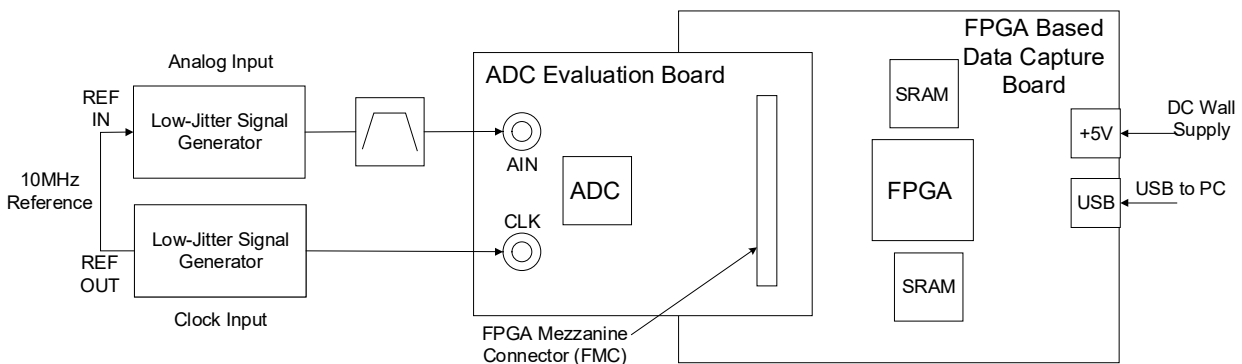


Figure 1. Evaluation Platform Block Diagram

Contents

| | |
|--|-----------|
| 1. Functional Description | 3 |
| 1.1 Evaluation System Contents | 3 |
| 1.2 Installation Requirements | 3 |
| 1.3 Setup and Operation of the ADC Evaluation Platform | 3 |
| 1.4 Installing the iRADAnalyzer Software | 4 |
| 1.5 Running the Software | 9 |
| 2. PCB Layout Guidelines | 10 |
| 2.1 RHADC-FMCEV1Z Evaluation Board | 10 |
| 2.2 RHADC-FMCEV1Z Schematic | 11 |
| 2.3 Bill of Materials | 18 |
| A. Appendix | 21 |
| A.1 Input Signal Requirements | 21 |
| A.2 USB Driver Information | 21 |
| A.3 HPC FMC Pin Configuration | 22 |
| A.4 Analog Signal Generators | 24 |
| 3. Ordering Information | 24 |
| 4. Revision History | 24 |

1. Functional Description

The the RHADC-FMCEV1Z motherboard along with a radiation hardened precision SAR ADC evaluation board (daughterboard) is intended to operate with iRADAnalyzer software application. The motherboard collects digitized data from the daughterboard ADC and relays that data to a PC running iRADAnalyzer so the data can be analyzed for performance.

1.1 Evaluation System Contents

The evaluation system is provided with a USB cable to connect to a PC and a 5V power supply. A PC running the Microsoft Windows™ 7 or greater operating system with Java installed is required. iRADAnalyzer software can be downloaded from the Renesas web site. When operating the RHADC-FMCEV1Z motherboard with a daughter board (such as the ISL73141SEH daughter board), analog input signal and clock sources should be provided along with any optional filters and power supply connections.

1.2 Installation Requirements

To operate the RHADC-FMCEV1Z motherboard, the iRADAnalyzer software must be installed. Before installing the iRADAnalyzer, confirm the following:

- PC operating system is Windows 7 or greater
- The account that the software is installed from has administrator privileges.
- Java is required for operation of the iRADAnalyzer software which controls the RHADC-FMCEV1Z.
 - If the Java runtime environment is not installed on the PC, Java is installed during the installation of the iRADAnalyzer software.
 - Windows has associated files with the *.jar extension with the java runtime environment. This is done by default during the java runtime environment install. File extension associations can be modified by opening an explorer window, clicking on the **Tools** drop-down menu, selecting **Folder Options**, and interacting with the pop-up window.:

1.3 Setup and Operation of the ADC Evaluation Platform

To set up the ADC evaluation platform, the following items are required:

- RHADC-FMCEV1Z motherboard
- USB cable (USB-A to USB-B, 1.25 to 2M long) (supplied with RHADC-FMCEV1Z)
- 5V power supply, 18W minimum (supplied with RHADC-FMCEV1Z)
- Daughter card containing ADC to be tested (ordered separately)
- Suitable signal and clock sources (see [Input Signal Requirements](#)) (supplied by user)
- PC with free USB2.0 port, logged in with administrator rights (supplied by user)

1.4 Installing the iRADAnalyzer Software

1. Double click the installer executable (that is, iRADAnalyzer_VX.XX.X.exe). This launches the installer, resulting in the following window for language selection. Click **Next >**.

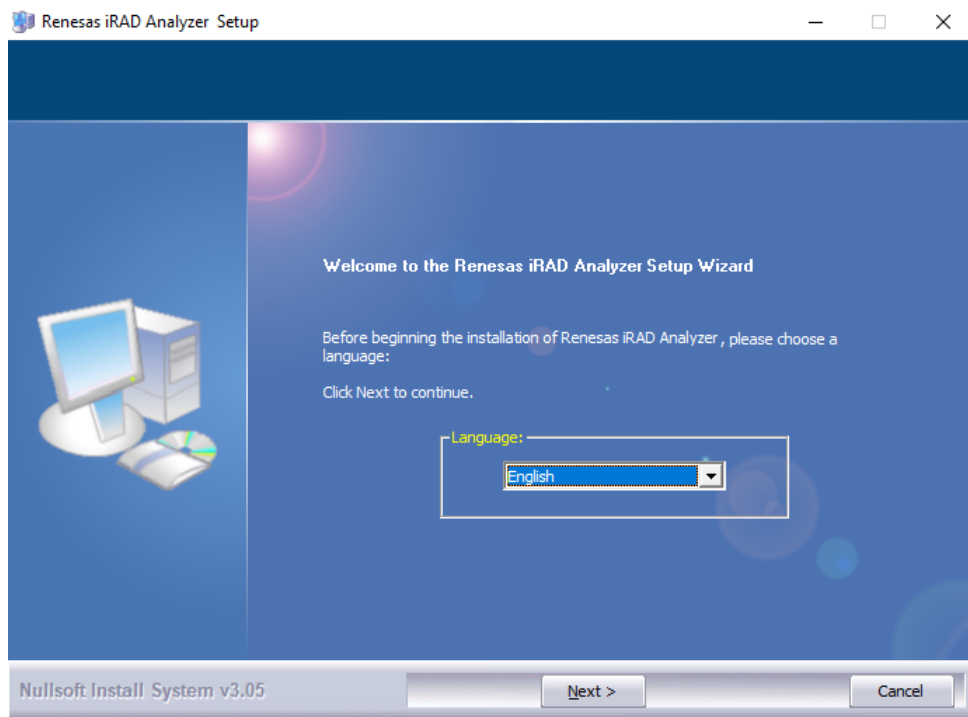


Figure 2. Language Selection Window

2. The install introduction page opens up showing the current version of the software, click **Next >** to continue.

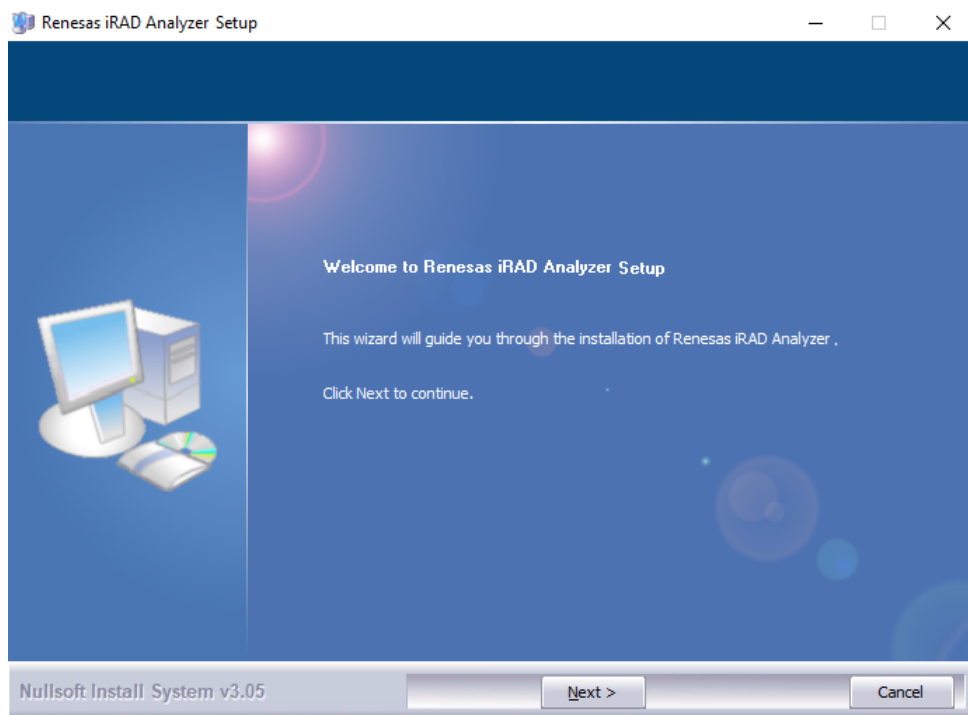


Figure 3. Install Introduction Window

- 3. In the License Agreement window, confirm the Software Evaluation License Agreement, by clicking the **I Agree** radio button, then click **Next >**.

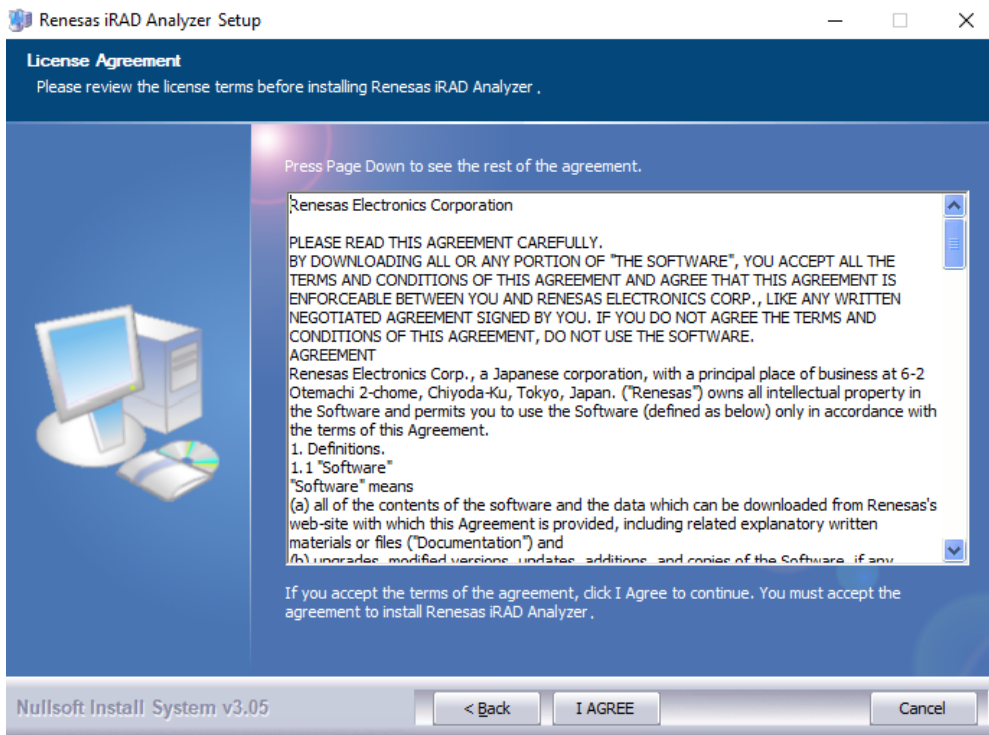


Figure 4. License Agreement Window

- 4. The Choose Install Location window opens. Click **Next >**.

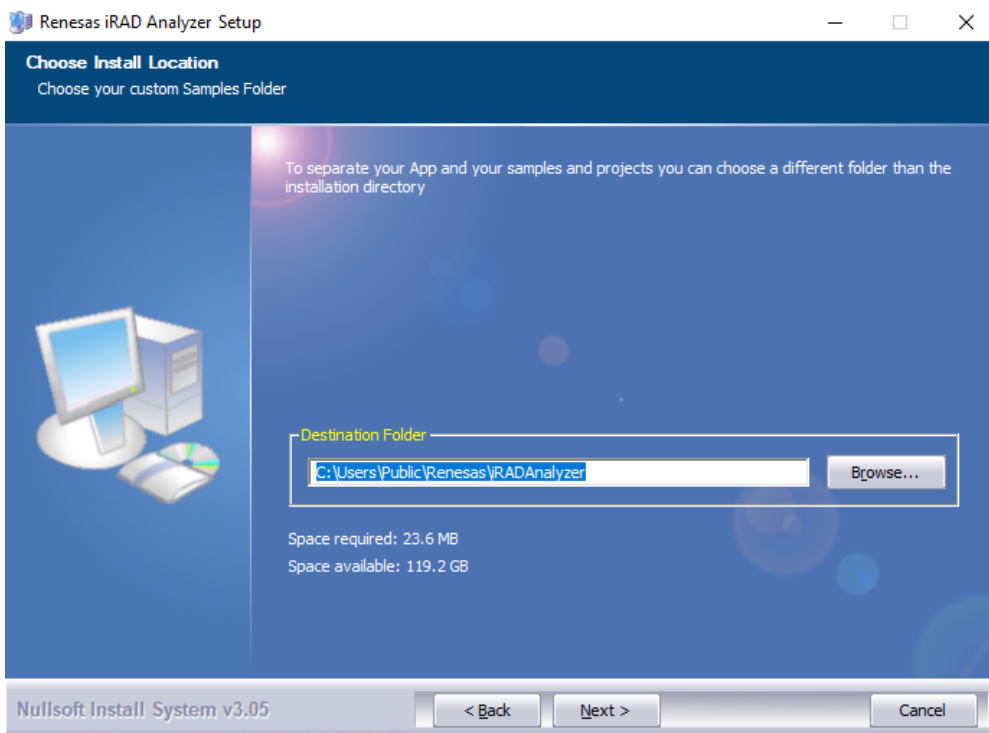


Figure 5. Choose Install Location Window

5. The Choose Start Menu Folder window opens. If installing with administrative privileges, the **For all users** or **Only for the current user** options can be selected to indicate which users the shortcuts are created for. Click **Next >**.

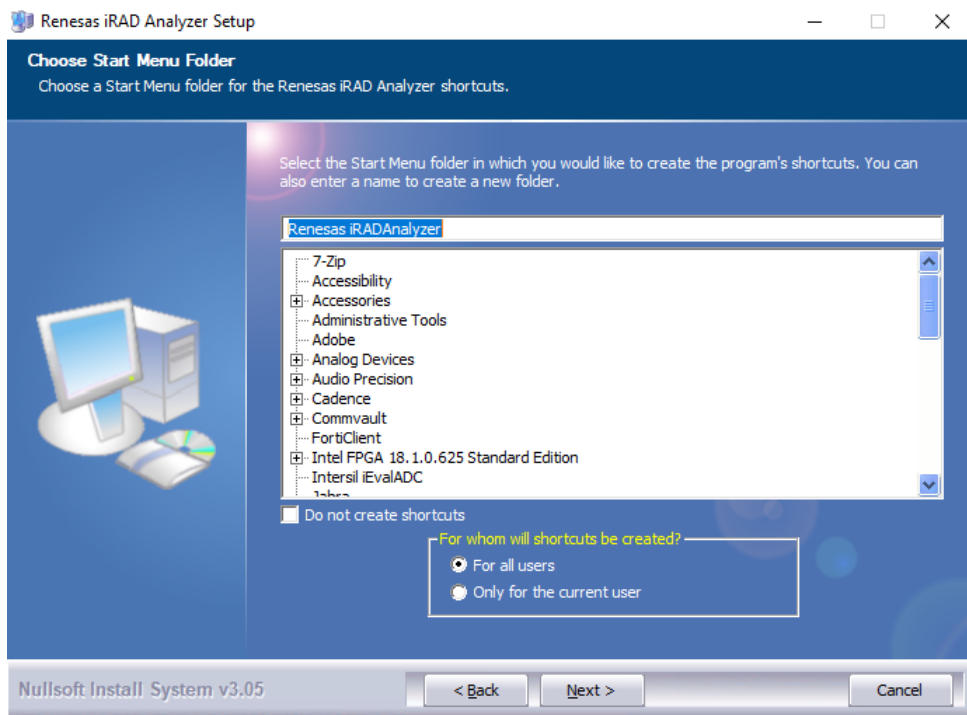


Figure 6. Choose Start Menu Folder Window

6. The Additional Tasks window opens. Select the desired options for creating a desktop icon and for installing the driver for the RHADC-FMCEV1Z. **Note:** If the USB driver has previously been installed, the **Install Driver** check box can be left unchecked. Click **Next >**.

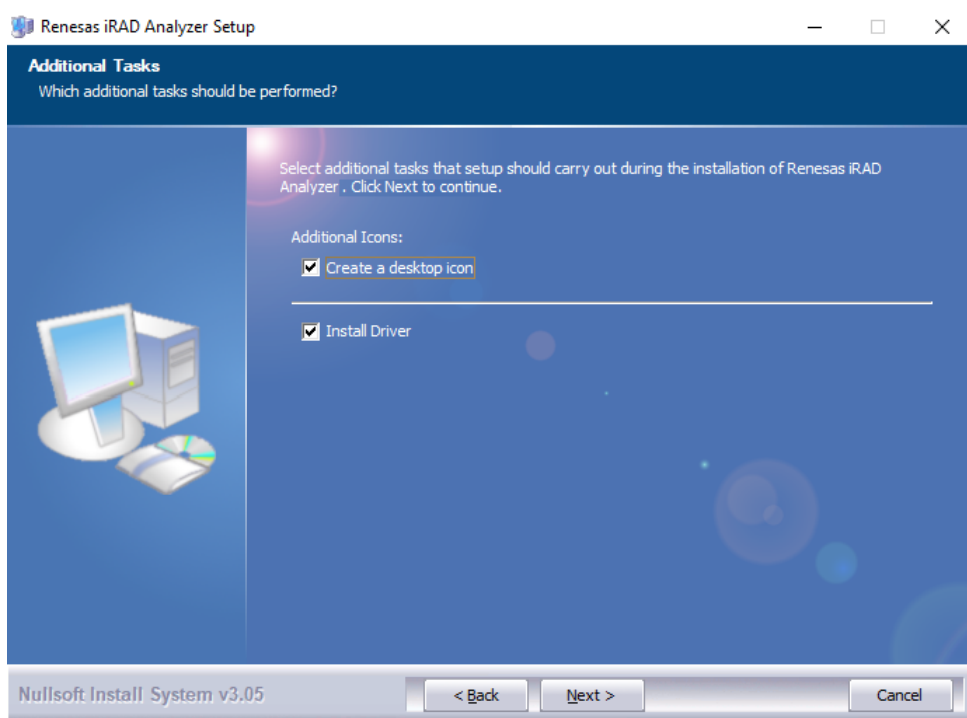


Figure 7. Additional Tasks Window

7. The Complete Installation window opens. Click **Install**.

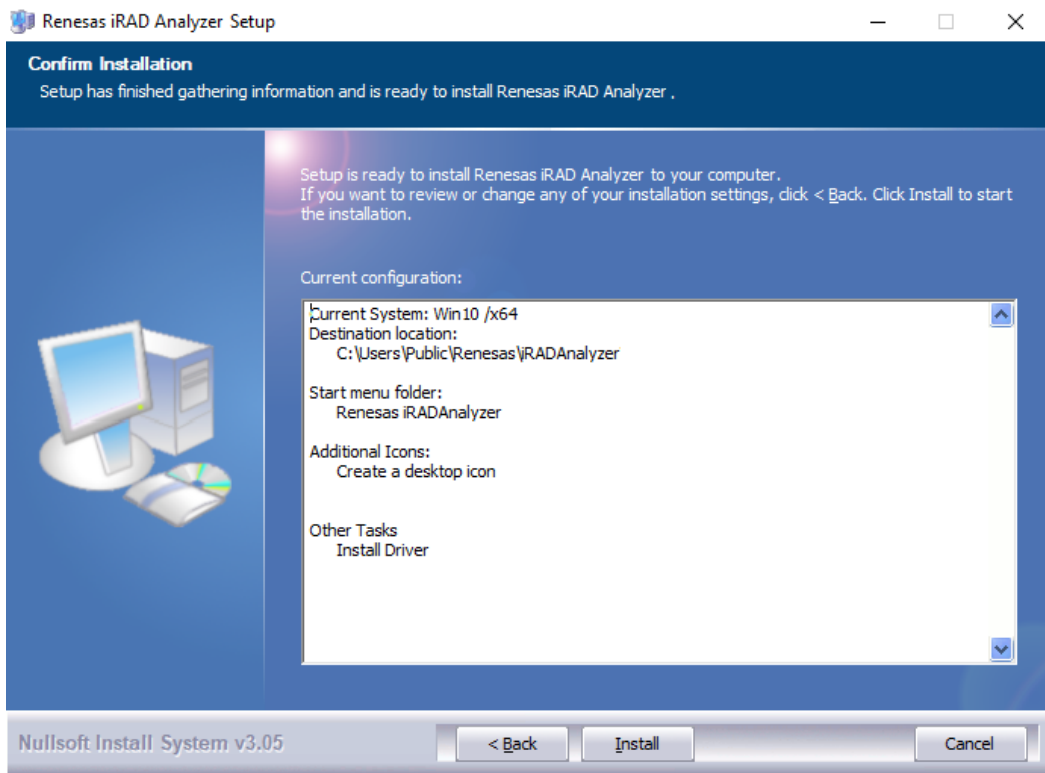


Figure 8. Complete Installation Window

8. If the driver has not previously been installed, follow the prompts to install the driver. Select the check box to always trust drivers from Renesas Electronics America Inc. and click **Install**.

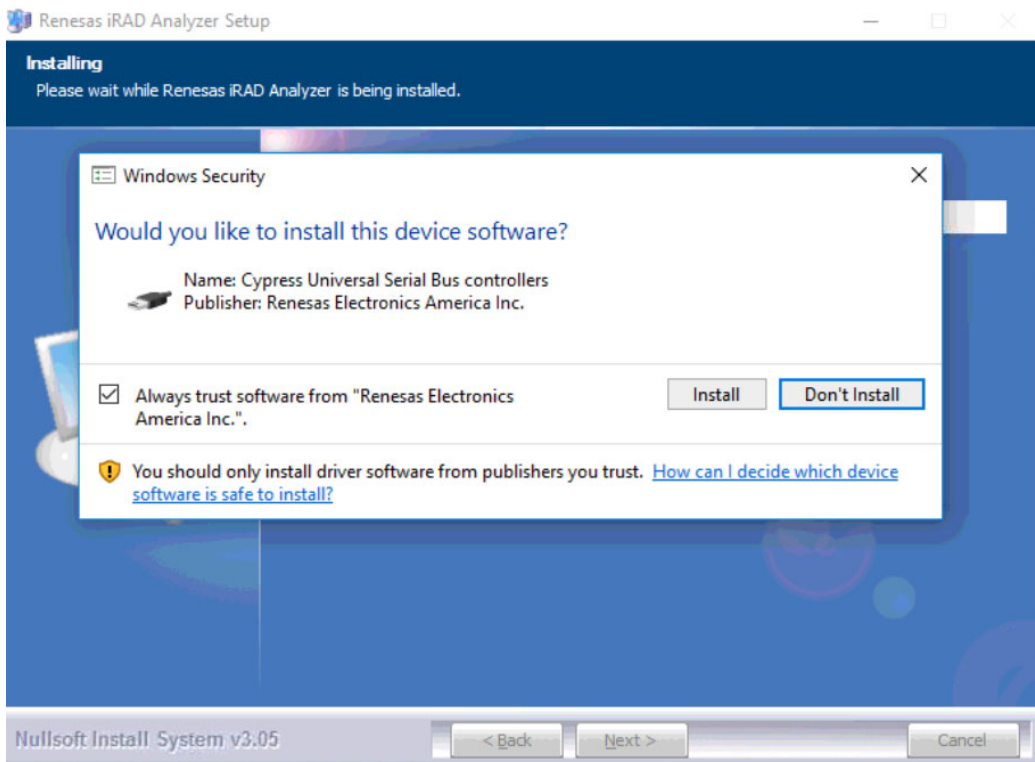


Figure 9. Install the USB Driver

9. The Completing Renesas iRADAnalyzer VX.XX.X Setup window opens. Click **Finish**.

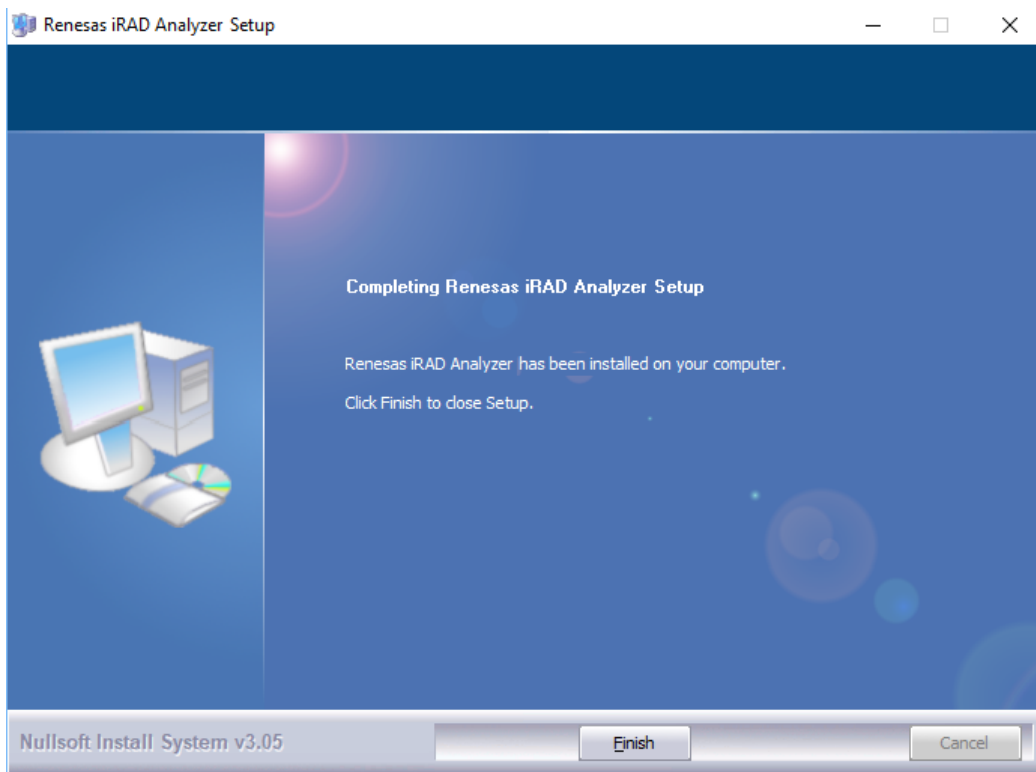


Figure 10. Complete the iRADAnalyzer Installation

1.5 Running the Software

To begin testing, supply +5V to the motherboard, any necessary power supply voltages to the daughter board and then connect the analog input and clock signals to the daughter board (Figure 1). The motherboard (RHADC-FMCEV1Z) can provide the appropriate supply voltages if required by the daughter card and captures digital data from the daughter card. The daughter cards contain the ADC and attach directly to the motherboard to form the ADC evaluation platform (Figure 1).

When the software has been installed, the software can be launched by double-clicking on the shortcut located on the desktop, by default called iRADAnalyzer. The first time the program is launched, there might be a delay as the Java runtime environment unpacks the required libraries. Subsequent runs are much shorter. A window similar to Figure 11 is displayed when iRADAnalyzer has launched.

There is no need to attach the evaluation kit hardware to launch the software. However, some features of the software might not be available or might not operate without hardware attached. The information area at the bottom of the window indicates if the software has detected connected hardware.

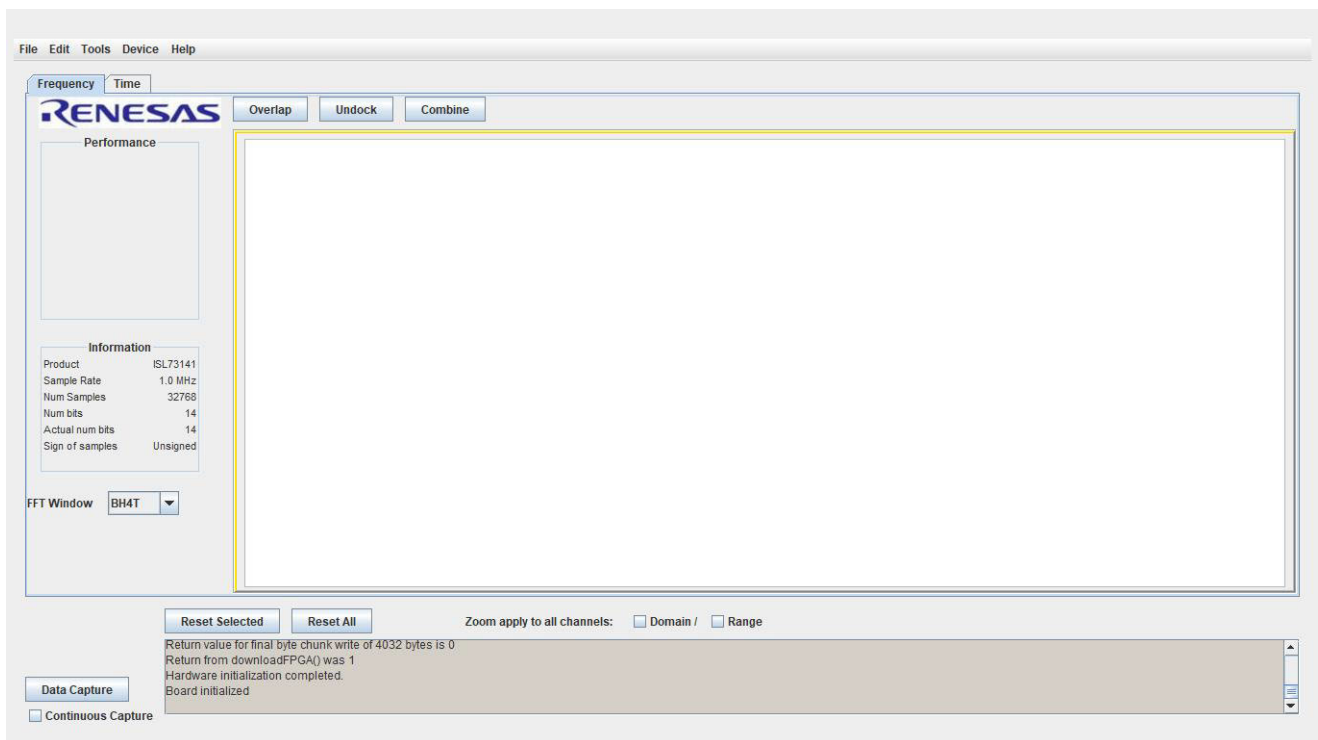


Figure 11. Board Initialization

2. PCB Layout Guidelines

2.1 RHADC-FMCEV1Z Evaluation Board

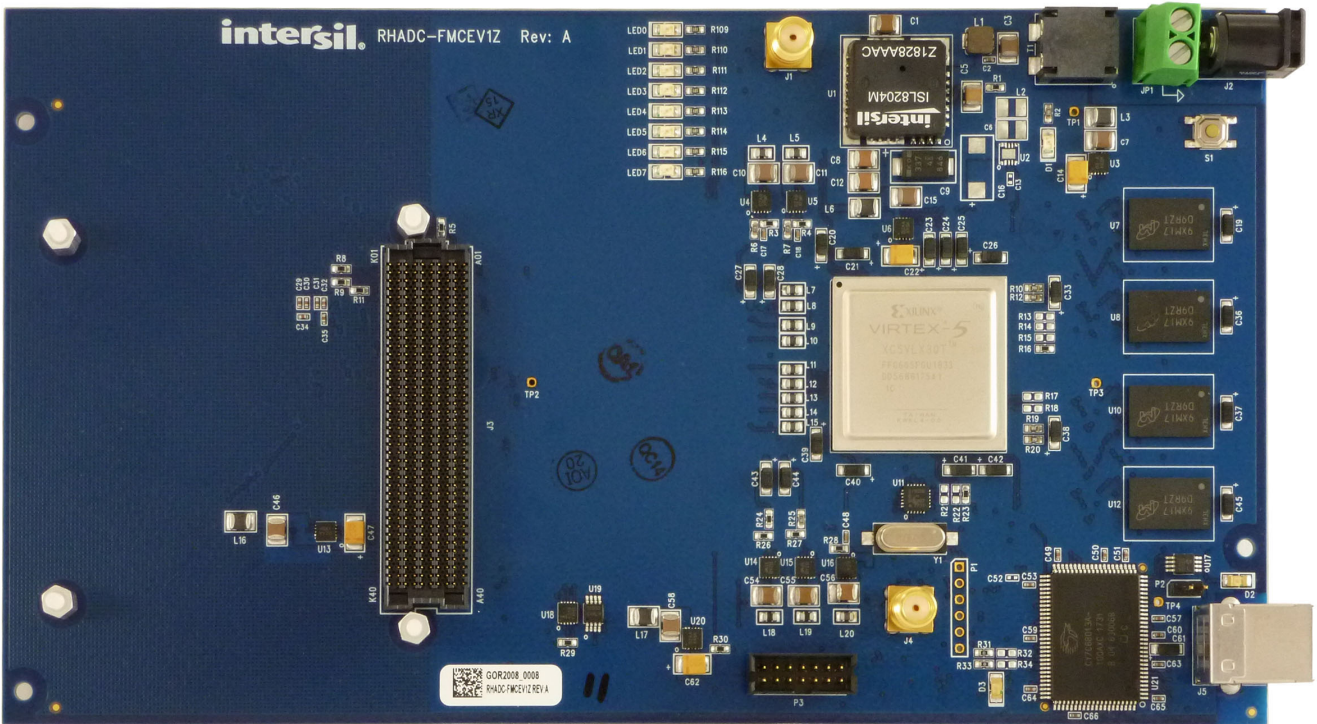


Figure 12. RHADC-FMCEV1Z Top

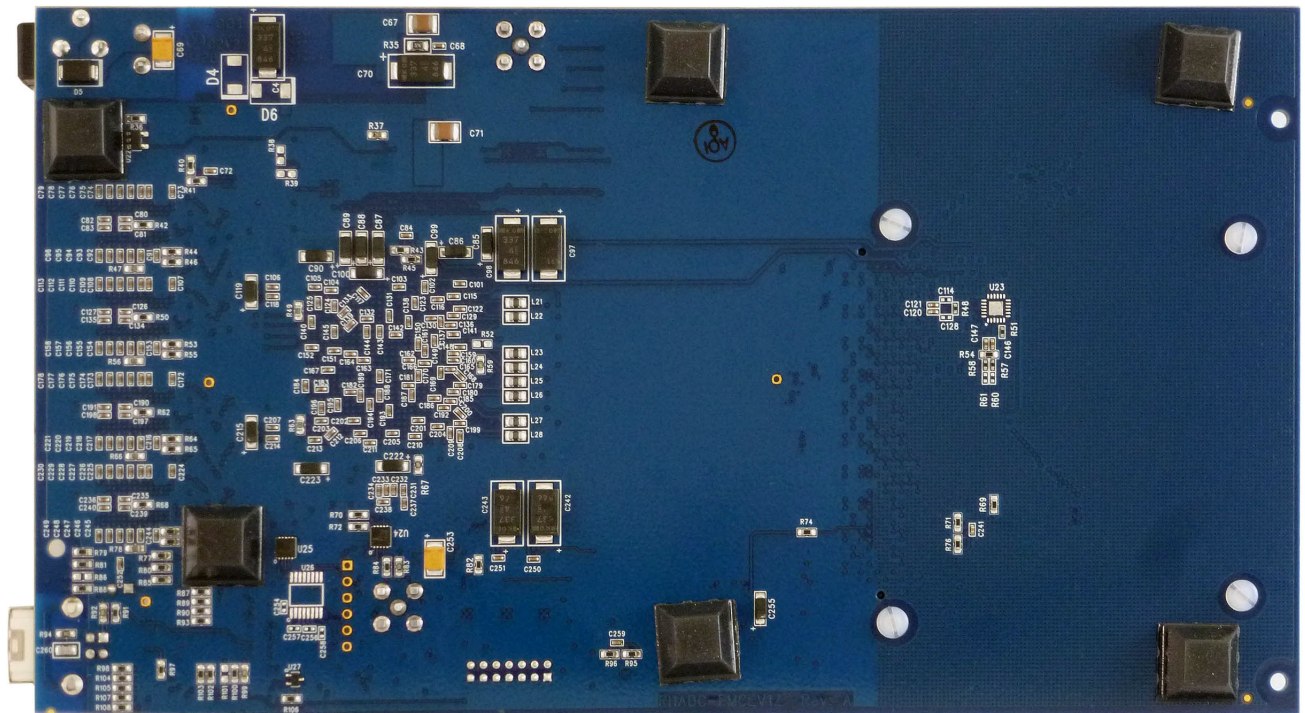


Figure 13. RHADC-FMCEV1Z Bottom

2.2 RHADC-FMCEV1Z Schematic

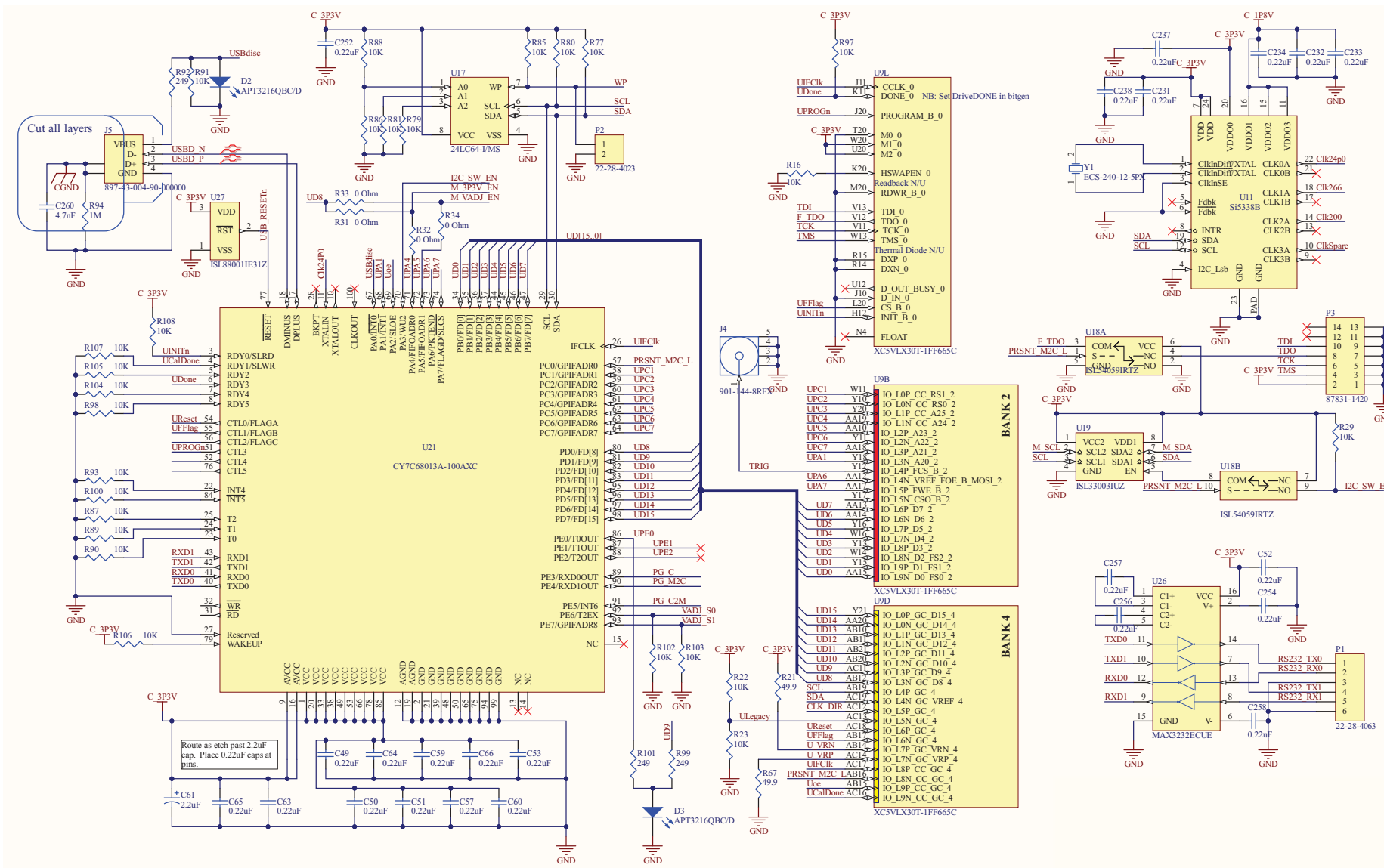


Figure 14. USB Interface

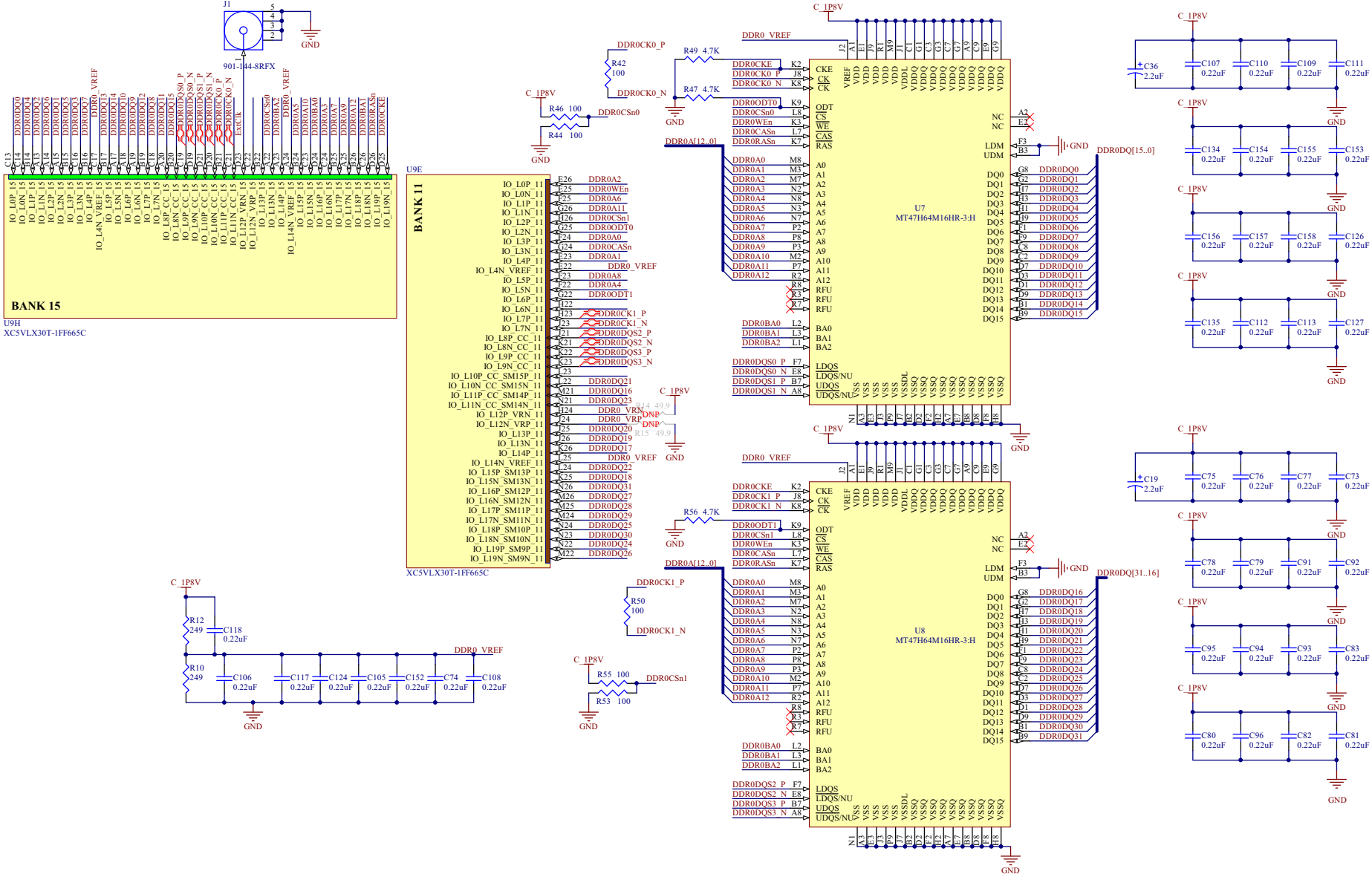


Figure 15. DDR2 DRAM Controller

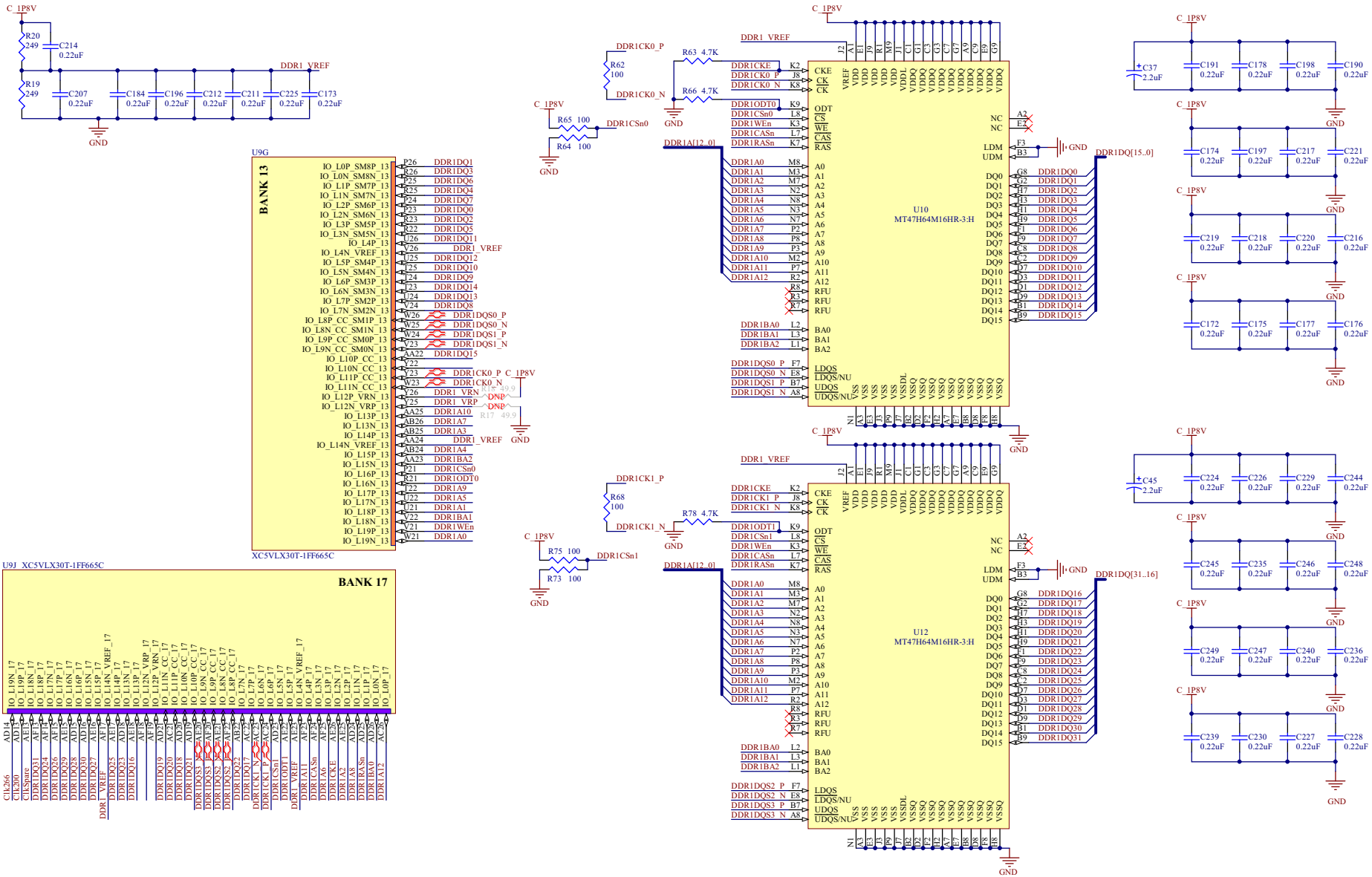


Figure 16. DDR2 DRAM Controller 1

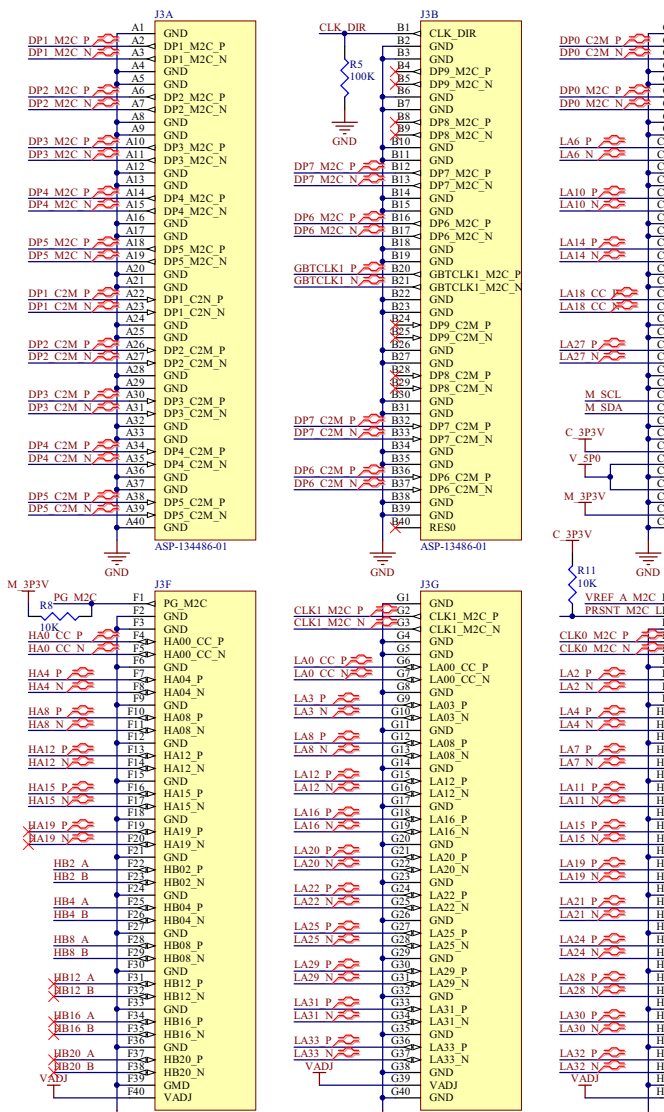
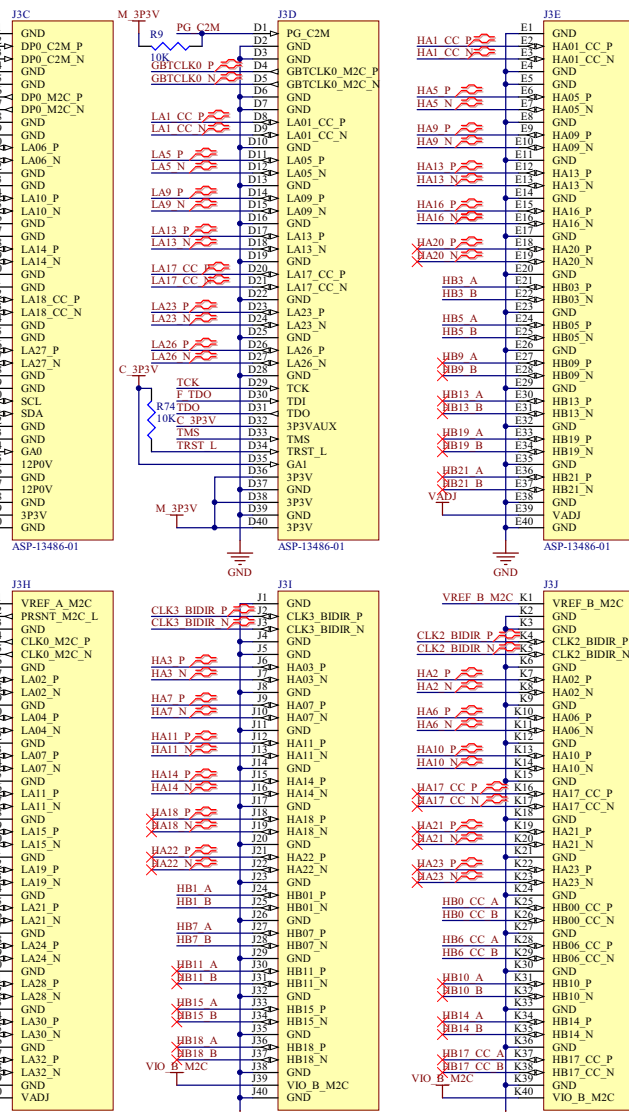
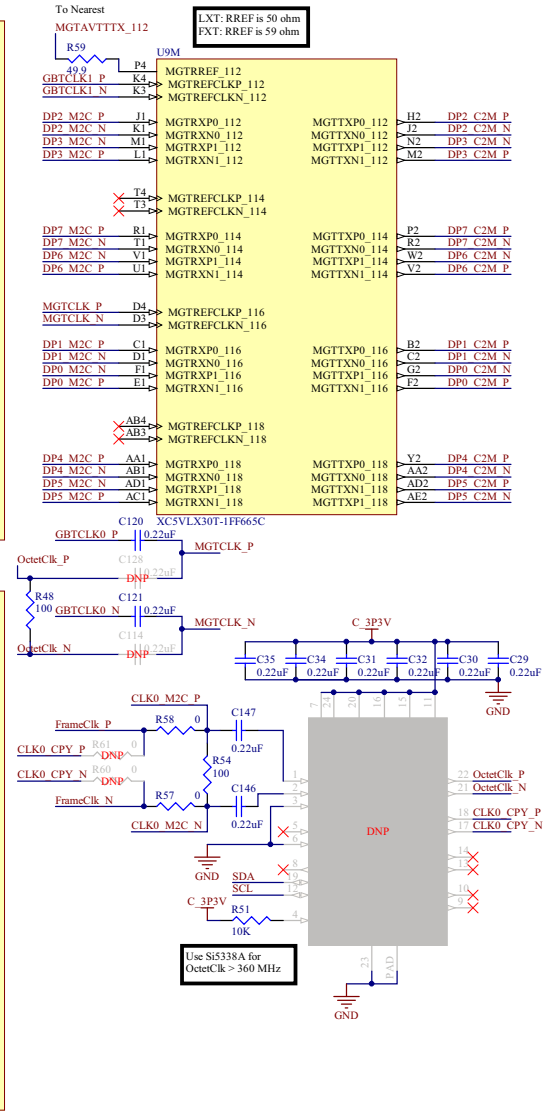


Figure 17. VITA 57 Connector and FPGA MGT

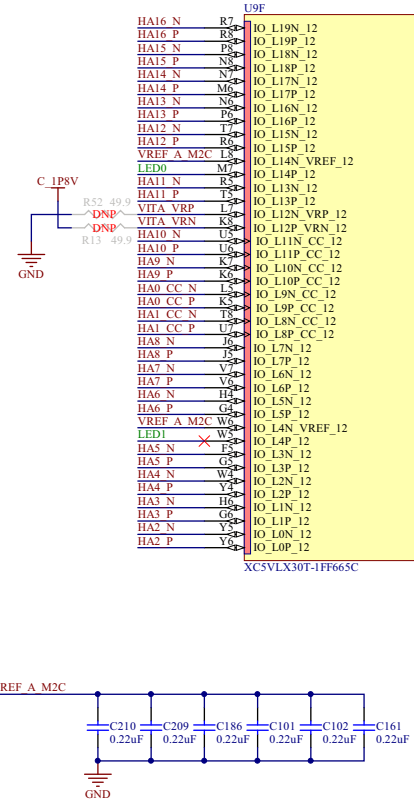
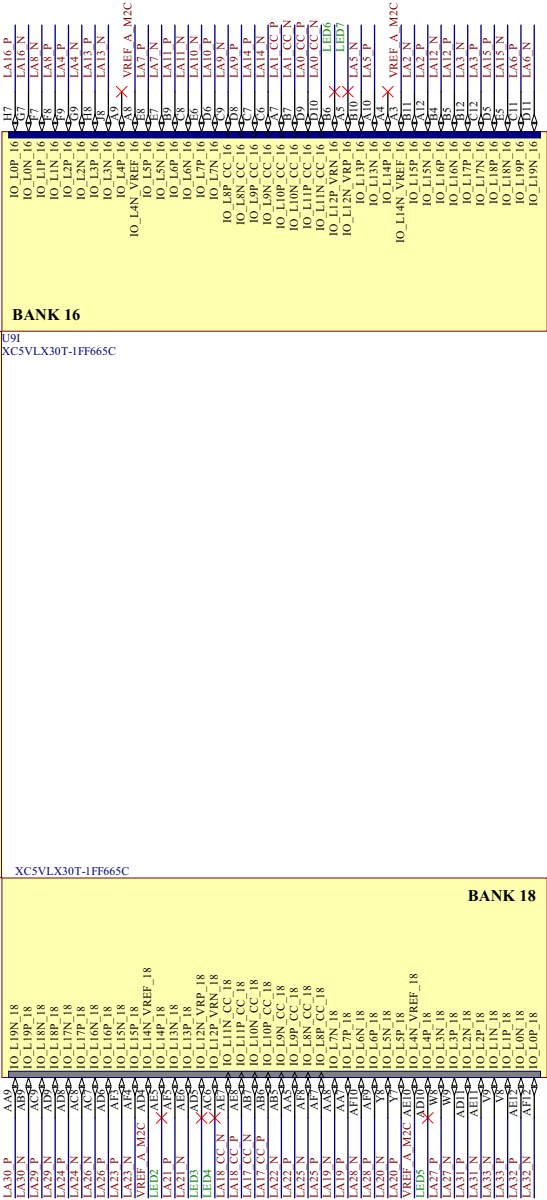
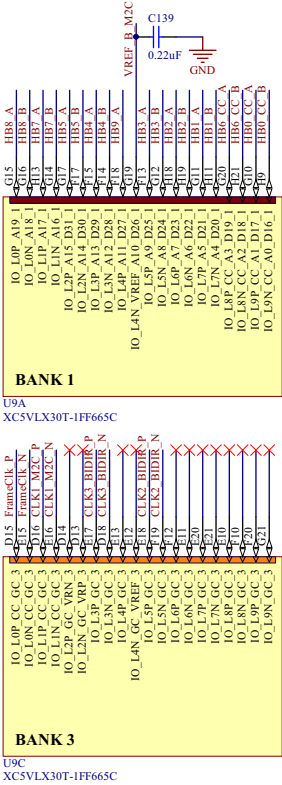
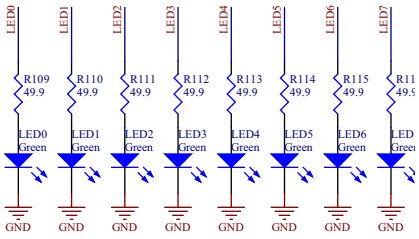


Figure 18. FPGA VITA 57 Interface

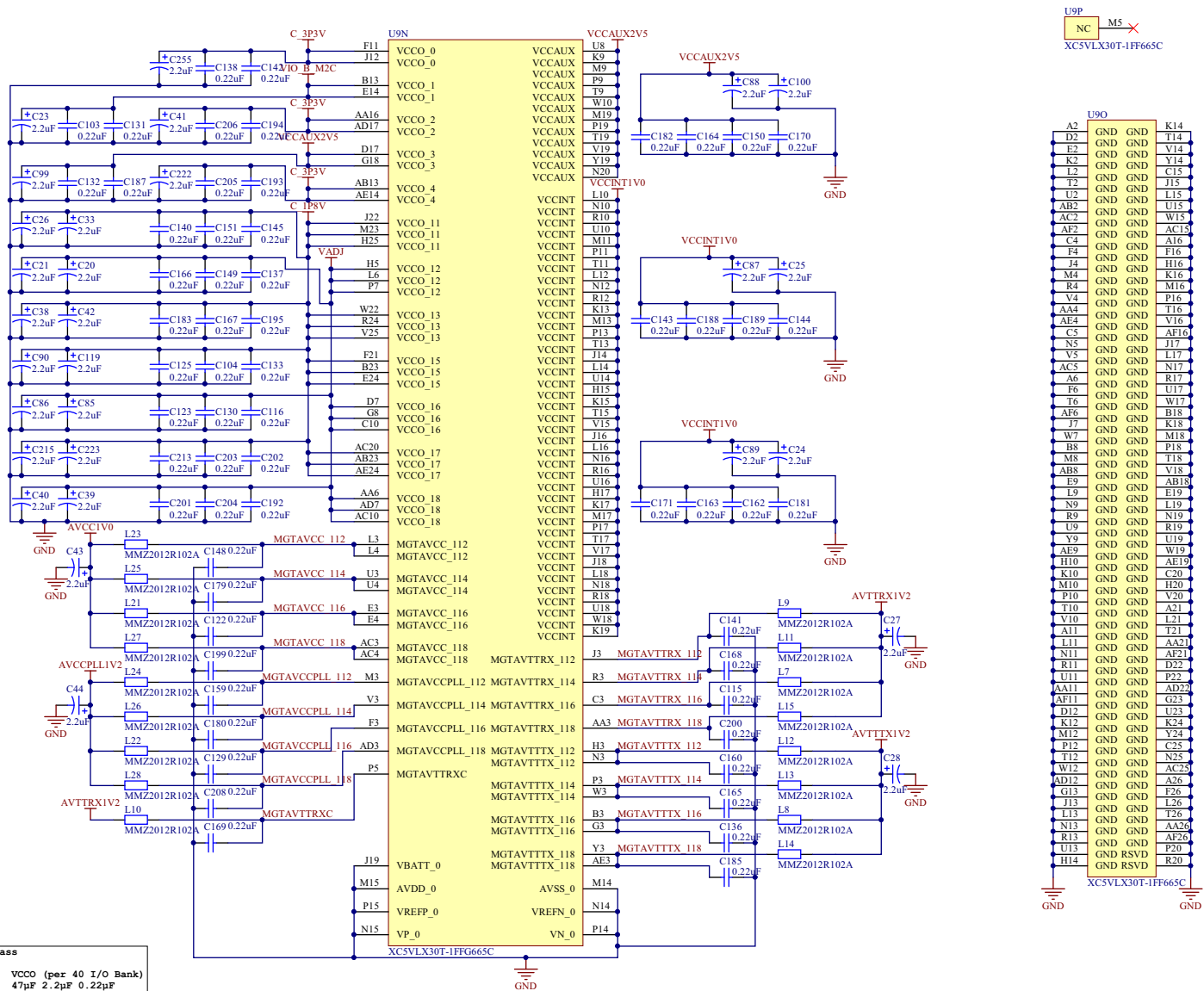


Figure 19. FPGA Power

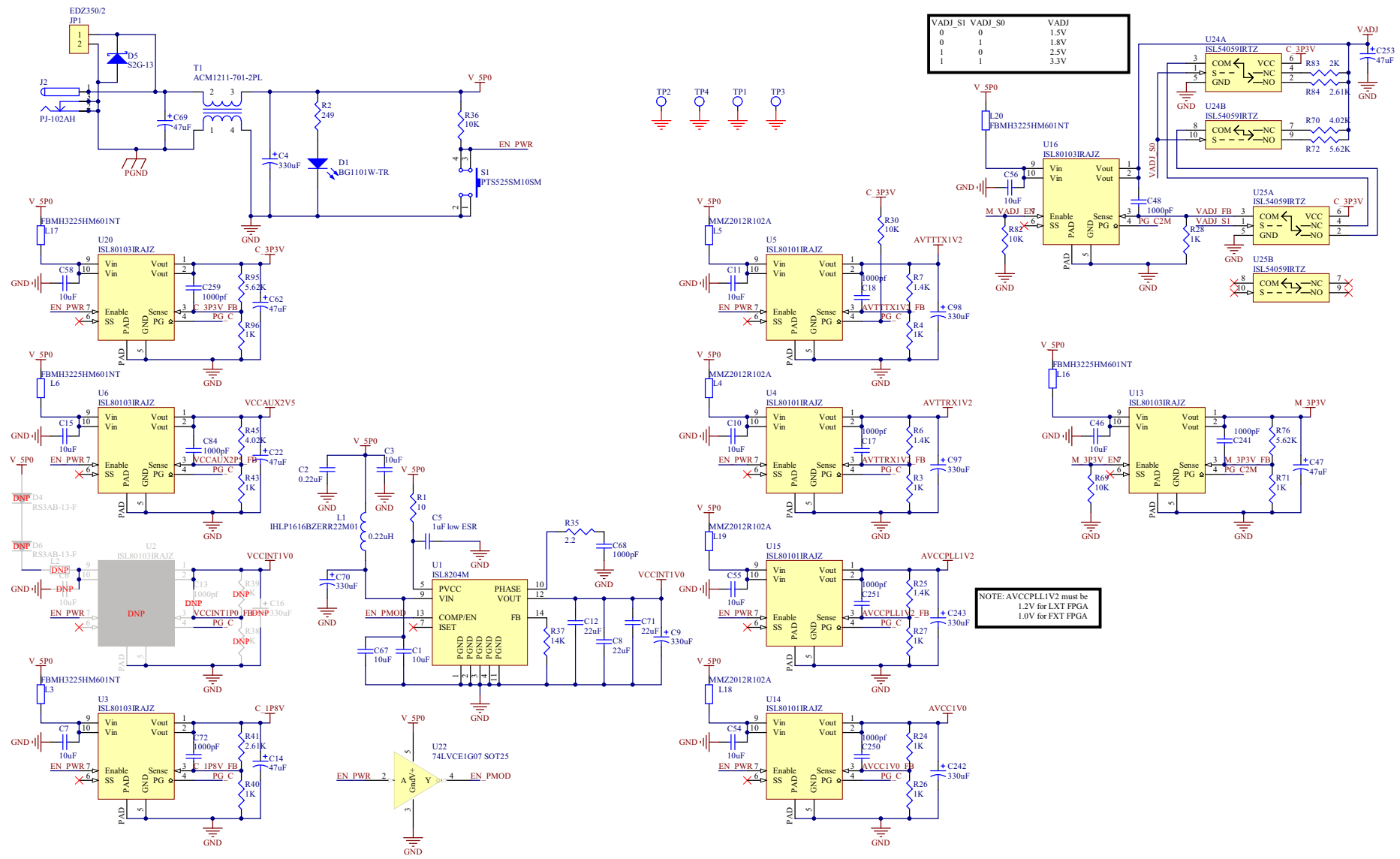


Figure 20. Power Regulation

2.3 Bill of Materials

| Qty | Reference Designator | Description | Manufacturer | Manufacturer Part |
|-----|--|---|---------------------|--------------------------|
| 1 | | PWB-PCB, ADCMB-HSFMC-EV1Z, REVC, ROHS | Imagineering Inc | ADCMB-HSFMC-EV1ZREVCPCB |
| 10 | C17, C18, C48, C68, C72, C84, C241, C250, C251, C259 | CAP, SMD, 0402, 1000pF, 50V, 10%, X7R, ROHS | Venkel | C0402X7R500-102KNE |
| 176 | C2, C29, C30, C31, C32, C34, C35, C49, C50, C51, C53, C57, C59, C60, C63, C64, C65, C66, C73-C83, C91-C96, C101-C113, C115-C118, C120-C127, C129-C214, C216-C221, C224-C240, C244-C249, C252 | CAP, SMD, 0402, 0.22μF, 16V, 10%, X5R, ROHS | Venkel | C0402X5R160-224KNE |
| 1 | C260 | CAP, SMD, 0805, 4700pF, 50V, 5%, C0G, ROHS | Murata | GRM2165C1H472JA01D |
| 1 | C5 | CAP, SMD, 1210, 1μF, 50V, 10%, X7R, ROHS | Venkel | C1210X7R500-105KNE |
| 12 | C1, C3, C7, C10, C11, C15, C46, C54, C55, C56, C58, C67 | CAP, SMD, 1210, 10μF, 16V, 10%, X5R, ROHS | | |
| 3 | C8, C12, C71 | CAP, SMD, 1210, 22μF, 10V, 10%, X5R, ROHS | Murata | GRM32ER71A226KE20L (X7R) |
| 34 | C19, C20, C21, C23, C24, C25, C26, C27, C28, C33, C36-C45, C61, C85, C86, C87, C88, C89, C90, C99, C100, C119, C215, C222, C223, C255 | CAP-TANT, SMD, A, 2.2μF, 6.3V, 20%, <9Ω, ROHS | Kemet | T499A225K006ATE6K5 |
| 6 | C14, C22, C47, C62, C69, C253 | CAP-TANT, LOW ESR, SMD, B, 47μF, 10V, 20%, 70mΩ, ROHS | AVX | TCJB476M010R0070 |
| 7 | C4, C9, C70, C97, C98, C242, C243 | CAP-TANT, LOW ESR, SMD, D, 330μF, 4V, 20%, 7mΩ, ROHS | Kemet | T520D337M004ATE007 |
| 1 | L1 | COIL-PWR INDUCTOR, SMD, 4.4x4, 0.22μH, 20%, 13A, ROHS | Vishay | IHLP1616BZERR22M01 |
| 1 | P2 | CONN-HEADER, 1x2, RETENTIVE, 2.54mm, 0.230x0.120, ROHS" | Berg/FCI | 69190-202HLF |
| 1 | P3 | CONN-HEADER, TH, 2X7, SHROUDED, 2mm, VERTICAL, ROHS | Molex | 87831-1420 |
| 1 | J5 | CONN-USB TYPE B, RECEPTACLE, PCB MOUNT, ROHS | Mill-Max | 897-43-004-90-000 |
| 2 | J1, J4 | CONN-RF, SMA JACK, 50Ω, PCB MNT, STRAIGHT, ROHS | Amphenol | 901-144-8RFX |
| 1 | J3 | CONN-SOCKET ARRAY, TH, 400P, 0.05 PITCH, CUSTOM, ROHS | Samtec | ASP-134486-01 |
| 1 | JP1 | CONN-TERMINAL BLOCK, TH, 2POS, 5.08mm, 12-22AWG, ROHS | On Shore Technology | EDZ350/2 |

| Qty | Reference Designator | Description | Manufacturer | Manufacturer Part |
|-----|-------------------------|--|-----------------------------|----------------------|
| 1 | J2 | CONN-PWR JACK, THRU-HOLE, 2.1x5.5mm, BLACK, R/A, ROHS | CUI, Inc. | PJ-102AH |
| 1 | D5 | DIODE-RECTIFIER, SMD, 2P, SMB, 400V, 1.5A, GPP, ROHS | Diodes Inc. | S2G-13-F |
| 2 | D2, D3 | LED, SMD, 1206, BLUE, 3.3V, 20mA, 100mcd, 470nm, ROHS | Kingbright | APT3216QBC/D-T |
| 9 | D1, LED0-LED7 | LED, SMD, 1206, GREEN CLEAR, 2.1V, 20mA, 2mcd, ROHS | Stanley Electric | BG1101W-TR |
| 1 | T1 | COIL-COMMON CHOKE, SMD, 12x11, 700Ω, 8A, 2LINE, ROHS | TDK | ACM1211-701-2PL-TL |
| 4 | L3, L6, L16, L17 | FERRITE INDUCTOR, SMD, 1210, 600Ω, 30%, 100MHz, ROHS | Taiyo Yuden | FBMH3225HM601NT |
| 22 | L4, L5, L7-L15, L18-L28 | FERRITE BEAD, SMD, 0805, 1k, 0.5A, 100MHz, ROHS | TDK | MMZ2012R102A |
| 1 | U17 | IC-SERIAL EEPROM, 8P, MSOP, 64k, 400kHz, ROHS | Microchip Technology | 24LC64F-I/MS |
| 1 | U22 | IC-BUFFER/DRIVER W/OPEN DRAIN, SMD, 5P, SOT25, ROHS | Diodes Inc. | 74LVCE1G07W5-7 |
| 1 | U21 | IC-USB MICROCONTROLLER, HI SPEED, 100P, TQFP, 16Kx8, ROHS | Cypress Semiconductor | CY7C68013A-100AXC |
| 1 | U19 | IC-I2C 2-WIRE BUS BUFFER, 8P, MSOP, 3x3, ROHS | Renesas Electronics America | ISL33003IUZ |
| 3 | U18, U24, U25 | IC-DUAL SPDT ANALOG SWITCH, 1.8-6.5V, 10P, TDFN, ROHS | Renesas Electronics America | ISL54059IRTZ |
| 4 | U4, U5, U14, U15 | IC-ADJ.V, 1A LDO REGULATOR, 10P, DFN, 3x3, ROHS | Renesas Electronics America | ISL80101IRAJZ |
| 5 | U3, U6, U13, U16, U20 | IC-ADJ.V, 3A LDO REGULATOR, 10P, DFN, 3x3, ROHS | Renesas Electronics America | ISL80103IRAJZ |
| 1 | U1 | IC-4A DC/DC PWR SUPPLY MODULE, 15P, QFN, 15x15, ROHS | Renesas Electronics America | ISL8204MIRZ |
| 1 | U27 | IC-3.07V VOLTAGE SUPERVISOR, SMD, 3P, SC-70, ROHS | Renesas Electronics America | ISL88001IE31Z |
| 4 | U7, U8, U10, U12 | IC-MEMORY, DDR2 SDRAM, 84P, FBGA, ROHS | Micron Semiconductor | MT47H64M16NF-25EIT-M |
| 1 | U11 (See Assembly-Note) | IC-QUAD CLOCK GENERATOR, 24P, QFN, ADCMB-HSFMC PROGRAM, ROHS | Silicon Laboratories | SI5338B-A-GM |
| 1 | U9 | IC-FPGA, VIRTEX-5, 665P, FCBGA, ROHS | Xilinx | XC5VLX30T-1FFG665C |
| 1 | Y1 | OSC-CRYSTAL, SMD, 11.4x4.8, 24MHz, 12pF, 30ppm, ROHS | ECS Incorporated | ECS-240-12-5PX-TR |

| Qty | Reference Designator | Description | Manufacturer | Manufacturer Part |
|-----|--|---|--------------|-------------------|
| 2 | R57, R58 | RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS | Venkel | CR0402-16W-00T |
| 1 | R48 | RES, SMD, 0402, 100Ω, 1/16W, 1%, TF, ROHS | Venkel | CR0402-16W-1000FT |
| 1 | R51 | RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS | Panasonic | ERJ-2RKF1002X |
| 1 | R1 | RES, SMD, 0603, 10Ω, 1/10W, 1%, TF, ROHS | KOA | RK73H1JT10R0F |
| 2 | R31, R33 | RES, SMD, 0603, 0Ω, 1/10W, TF, ROHS | Venkel | CR0603-10W-000T |
| 13 | R42, R44, R46, R50, R53, R54, R55, R62, R64, R65, R68, R73, R75 | RES, SMD, 0603, 100Ω, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-1000FT |
| 10 | R3, R4, R24, R26, R27, R28, R40, R43, R71, R96 | RES, SMD, 0603, 1k, 1/10W, 1%, TF, ROHS | Panasonic | ERJ-3EKF1001V |
| 32 | R8, R9, R11, R16, R23, R29, R30, R36, R69, R74, R77, R79, R80, R81, R82, R85, R87, R88, R89, R90, R91, R93, R97, R98, R100, R102, R103, R104, R105, R106, R107, R108 | RES, SMD, 0603, 10k, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-1002FT |
| 1 | R5 | RES, SMD, 0603, 100k, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-1003FT |
| 1 | R94 | RES, SMD, 0603, 1M, 1/10W, 1%, TF, ROHS | Panasonic | ERJ-3EKF1004V |
| 3 | R6, R7, R25 | RES, SMD, 0603, 1.4k, 1/10W, 1%, TF, ROHS | Yageo | RC0603FR-071K4L |
| 1 | R37 | RES, SMD, 0603, 14k, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-1402FT |
| 1 | R83 | RES, SMD, 0603, 2k, 1/10W, 1%, TF, ROHS | KOA | RK73H1JT2001F |
| 7 | R2, R10, R12, R19, R20, R92, R99 | RES, SMD, 0603, 249Ω, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-2490FT |
| 2 | R41, R84 | RES, SMD, 0603, 2.61k, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-2611FT |
| 2 | R45, R70 | RES, SMD, 0603, 4.02kΩ, 1/10W, 1%, TF, ROHS | Panasonic | ERJ-3EKF4021V |
| 6 | R47, R49, R56, R63, R66, R78 | RES, SMD, 0603, 4.7k, 1/10W, 1%, TF, ROHS | Yageo | 9C06031A4701FKHFT |
| 10 | R59, R67, R109, R110, R111, R112, R113, R114, R115, R116 | RES, SMD, 0603, 49.9Ω, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-49R9FT |
| | | RES, SMD, 0603, 49.9Ω, 1/10W, 1%, TF, ROHS | Venkel | CR0603-10W-49R9FT |
| 3 | R72, R76, R95 | RES, SMD, 0603, 5.62k, 1/10W, 1%, TF, ROHS | Panasonic | ERJ-3EKF5621V |
| 1 | R35 | RES, SMD, 0805, 2.2Ω, 1/8W, 1%, TF, ROHS | Panasonic | ERJ-6RQF2R2V |

| Qty | Reference Designator | Description | Manufacturer | Manufacturer Part |
|-----|---------------------------------------|--|----------------|-------------------|
| 1 | S1 | SWITCH-PUSH, SMD, 4P, 5.25mm, 160GF, SPST, OFF-MOM, ROHS | C&K Components | PTS525SM10SMTRLFS |
| 1 | BAG & SHIP W/BOARD | AC/DC PWR SUPPLY, DESKTOP ADAPTER, 5V, 20W, 3FT, ROHS | CUI, Inc | SDI24-5-UD-P5 |
| 1 | BAG & SHIP W/BOARD | AC POWER CORD, NORTH AMERICA, 18AWG, 6FT, ROHS | CUI, Inc | AC-C7-NA |
| 4 | | SCREW, M2.5, 16mm, METRIC, PANHEAD, NYLON, ROHS | Keystone | 29336 |
| 4 | | STANDOFF-M4.5, 8mm, METRIC, F/F HEX, ALUM, ROHS | McMaster-Carr | 95947A003 |
| 6 | Bottom four corners | BUMPONS, 0.5inWx0.23inH, TAPERED SQUARE PAD, ROHS | 3M | SJ-5518 (BLACK) |
| 1 | a) SI5338B-A-GM requires programming | ASSEMBLY NOTE | | |
| 0 | b) By product line. SI5338B-A01482-GM | ASSEMBLY NOTE | | |
| 0 | c) Is pre-programmed part available | ASSEMBLY NOTE | | |
| 0 | d) From Silicon Laboratories | ASSEMBLY NOTE | | |
| 0 | TP1, TP2, TP3, TP4 | DO NOT POPULATE OR PURCHASE | | |

A. Appendix

A.1 Input Signal Requirements

A.1.1 Source Requirements

Source jitter and noise degrades performance. For best test results, a combined jitter (for both clock and signal sources) that does not exceed 200fs is recommended.

A.1.2 Sample Clock and Input Signal Source Setup

Sample clock settings are dependent on the connected ADC daughterboard, but can range from:

- 100kHz to 100MHz square wave, +5dBm to +10dBm (1.1V_{PP} to 2V_{PP}), sine wave also acceptable
- Signal settings for ADC daughterboard:
- DC to 1.1MHz, +5dBm to +10dBm (depending on analog input attenuation)

A.2 USB Driver Information

The USB driver for the RHADC-FMCEV1Z board should show up under Universal Serial Bus controllers in the Device Manager of the Windows operating system. It should be listed in the window similar to [Figure 21](#).

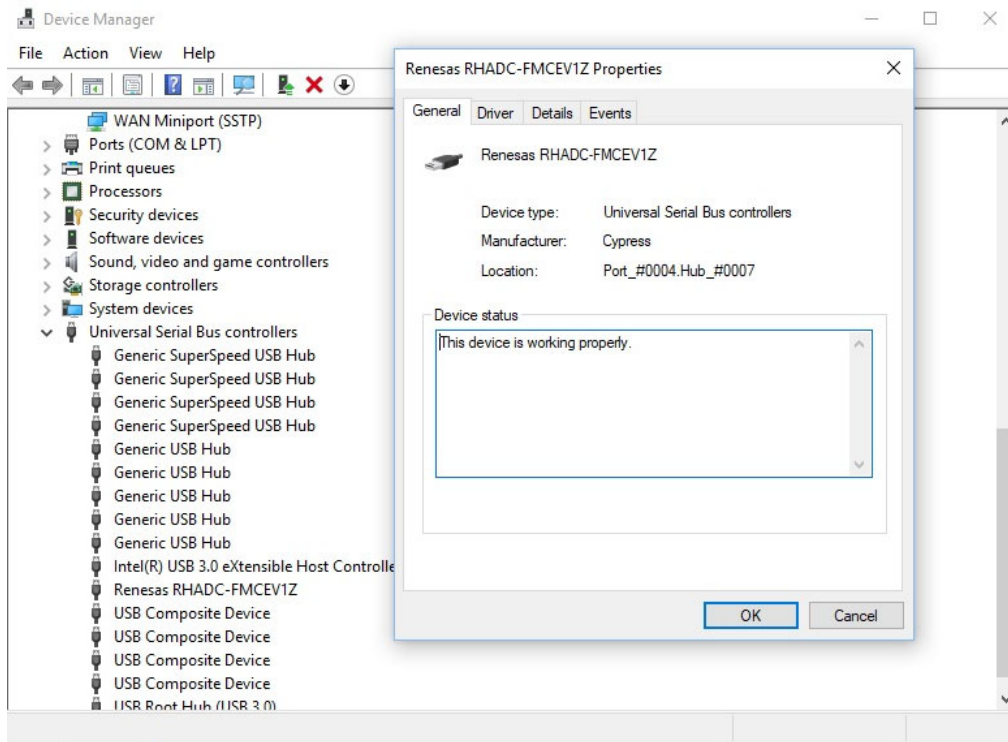


Figure 21. USB Driver Information in Device Manager

A.3 HPC FMC Pin Configuration

| HPC Pin | Function | Source ^{[1][2][3][4]} |
|---------|----------|--------------------------------|
| F4 | DCO | Daughter |
| E2 | D0 | Daughter |
| K7 | D1 | Daughter |
| J6 | D2 | Daughter |
| F7 | D3 | Daughter |
| E7 | D4 | Daughter |
| K10 | D5 | Daughter |
| J9 | D6 | Daughter |
| F10 | D7 | Daughter |
| E9 | D8 | Daughter |
| K13 | D9 | Daughter |
| J12 | D10 | Daughter |
| F13 | D11 | Daughter |
| E12 | D12 | Daughter |
| J15 | D13 | Daughter |
| F16 | D14 | Daughter |
| E15 | D15 | Daughter |

| HPC Pin | Function | Source ^{[1][2][3][4]} |
|---------|--------------------------|--------------------------------|
| C39 | 3.3V Supply | Host |
| D1 | PG_C2M (Host Power Good) | Host |
| D36 | 3.3V Supply | Host |
| D38 | 3.3V Supply | Host |
| D40 | 3.3V Supply | Host |
| J24 | CSB | Host |
| J25 | SDO | Daughter |
| J39 | VIO_B_M2C | Daughter |
| K25 | SCLK | Host |
| K26 | SDI | Host/Daughter |
| K40 | VIO_B_M2C | Daughter |
| F26 | DEV_OE | Host |
| F1 | VIO_B_M2C Power Good | Daughter |
| E24 | ADC GP 0A | Host |
| E25 | ADC GP 1A | Host |
| E21 | ADC GP 2A | Host |
| E22 | ADC GP 3A | Host |
| J28 | ADC GB 0B | Host |
| E27 | ADC GB 1B | Host |
| F25 | ADC GB 2B | Host |
| F28 | ADC GM 0A | Host |
| F29 | ADC GM 1A | Host |
| F22 | ADC GM 2A | Host |
| J27 | ADC GD 0A | Host |
| K28 | ADC GL 0A | Host |
| H8 | ADC GF 0A | Host |
| H7 | ADC GF 1A | Host |
| G10 | ADC GF 2A | Host |
| G9 | ADC GF 3A | Host |
| C11 | ADC GF 4A | Host |
| G21 | ADC GP 0B | Host |
| G22 | ADC GP 1B | Host |
| G24 | ADC GP 2B | Host |
| G25 | ADC GP 3B | Host |
| G18 | ADC GC 0A | Daughter |
| G12 | ADC GC 1A | Daughter |
| H10 | ADC GC 2A | Daughter |
| D17 | ADC GG 0A | Daughter |

| HPC Pin | Function | Source ^{[1][2][3][4]} |
|---------|-----------|--------------------------------|
| H13 | ADC GG 1A | Daughter |
| H16 | ADC GG 2A | Daughter |

1. In this document, the terms host and motherboard are interchangeably used.
2. In this document, the terms daughter card and mezzanine card are interchangeably used.
3. Nets sourced by the host are used by the daughter card and must be supplied.
4. Nets sourced by the daughter are provided to the host card. In some cases (such as VIO_B_M2C, CLK_DIR, Power-Good) these can be ignored by the host or may not be provided by the daughter board.

A.4 Analog Signal Generators

Renesas uses the following analog signal generators as clock and signal sources when characterizing low-power, high-performance radiation hardened precision SAR ADCs:

- Rohde & Schwarz: SMA100A or SMA100B (with low phase noise and clock synthesis options)
- Audio Precision SYS-2722 Audio Analyzer/Generator

These generators provide very low jitter to optimize the SNR performance of the ADC under test. Other generators with similar phase noise performance can also be used. Contact Renesas Technical Support for recommendations.

3. Ordering Information

| Part Number | Description |
|---------------|---|
| RHADC-FMCEV1Z | FPGA based data capture board for radiation hardened precision SAR ADCs |

4. Revision History

| Rev. | Date | Description |
|------|--------------|--|
| 1.04 | Jul 19, 2024 | Applied latest template. Updated BOM. |
| 1.03 | Oct 26, 2022 | Updated Specifications section. Updated Evaluation System Contents section. Updated Installation Requirements section. Updated Figures 11 and 14. Updated Sample Clock and Input Signal Source Setup section. Updated Appendix B, C, and D. |
| 1.02 | Jun 15, 2021 | Updated the Installation Requirements section. |
| 1.01 | Oct 20, 2020 | Changed radiation tolerant to radiation hardened Removed Related Literature section Changed ISL73141SEHM to ISL73141SEH in Evaluation System Contents section |
| 1.00 | Aug 21, 2020 | Initial release |

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01 Jan 2024)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit www.renesas.com/contact-us/.