

ADC1xD1xxxCVAL

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ADC1xD1xxxCVAL

1. Introduction

The ADC1xD1x00QML products are low power, high performance 10b and 12b ADCs with sampling rates up to 1.6 GSPS as a dual channel ADC or 3.2 GSPS in a single channel interleaved mode. These products come in a hermetic 376 column ceramic grid array package (376 CCGA) for harsh environments, such as down hole or space.

The ADC1xD1x00 Evaluation Board (ADC1xD1x00CVAL) provides flexible ADC I/O connections for laboratory performance evaluation. As configured, the board is equipped with support shrouds for 100 pin Samtec connectors for interface to a logic analyzer, but capable of being configured for other types of logic analyzer connectors.

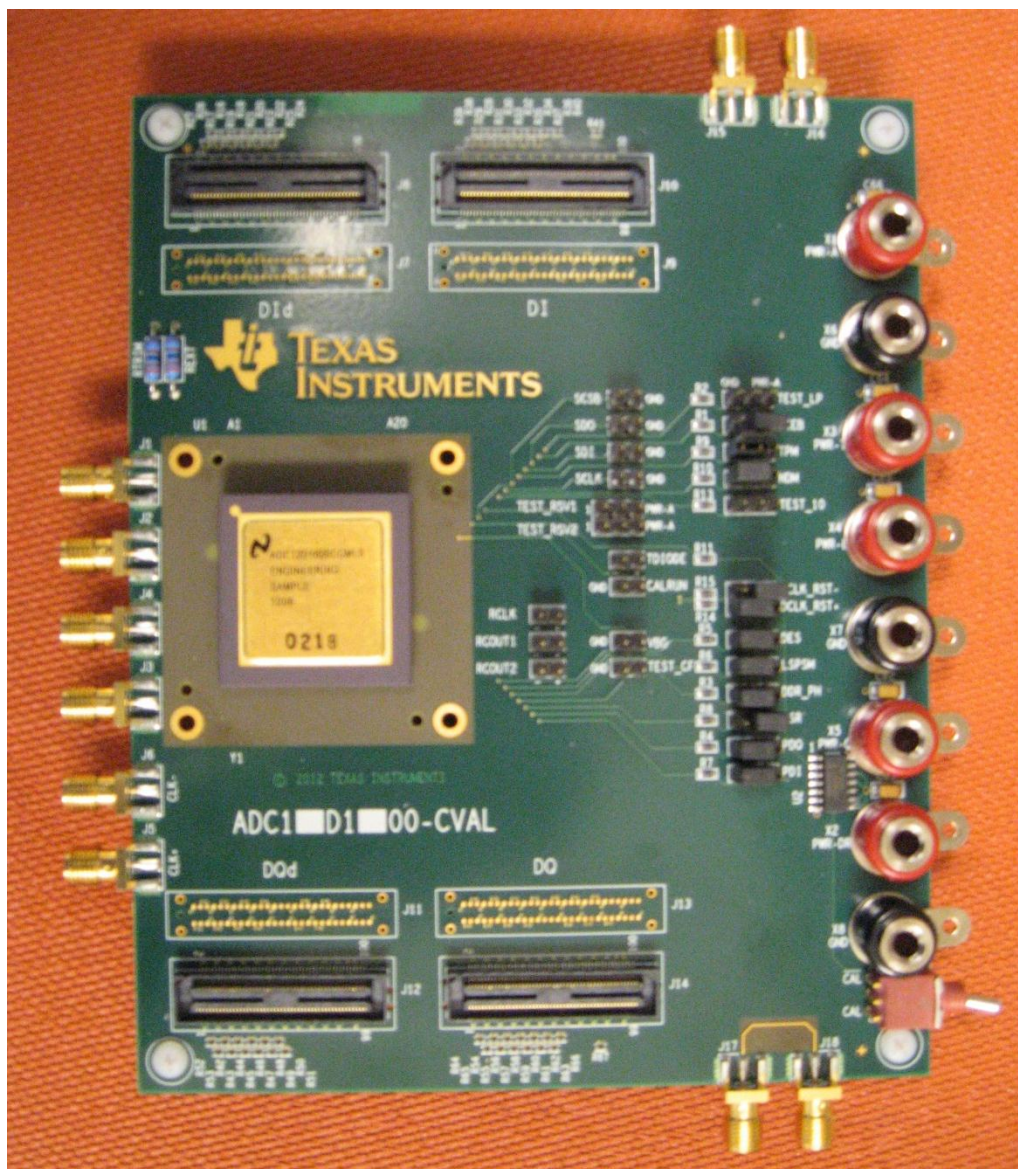


Figure 1: Picture of Evaluation Board

Because the 10- and 12-bit Gig ADCs are pin-compatible with one another, this board can be used with the following parts:

- ADC10D1000QML
- ADC12D1600QML

Refer to the individual product datasheets for information on Abs Max and operating conditions. .

2. Lab Equipment

The following lab equipment is required to use the ADC1xD1x00 EVAL board:

- Bench supply to drive 1.9V at 3A
- 1 signal generator + bandpass filter + balun to drive sampling clock. Suggested equipment:
 - SMA100A with B22 enhanced low phase-noise option
 - Trilithic 5VF tunable filter
- 1 signal generator to drive the analog input
- High-speed Logic Analyzer to capture the data. Suggested equipment:
 - Agilent 16702B Logic Analysis System
 - Agilent 16760A Timing and State Module
 - Agilent E5379A Differential Probe Adapter
 - Agilent E5386A Half-channel Probe Adapter (for data rates greater than 800MSPS)

Three key requirements for the sampling clock signal generator are low distortion, broad band noise, and phase noise. Even the highest quality signal generator will also produce harmonics, which the ADC performance is very sensitive to. Therefore, a bandpass filter, which can be tuned to the desired sampling clock frequency, will improve the performance of the system. In addition to this, the bandpass filter will reduce broadband noise and increase the system performance.

The logic analyzer should be able to capture differential LVDS signals at high speed, as determined by the sampling clock speed and ADC Demux Mode. In general, the Output Data Rate per Bank can be determined as follows:

Mode	Output Data Rate per Bank [MSPS]
DES 1:1 Non-Demux	$F_s/2$
DES 1:2 Demux	$F_s/4$
Non-DES 1:1 Non-Demux	F_s
Non-DES 1:2 Demux	$F_s/2$

Table 1. Output Data Rate per Bank by Mode

For example, the ADC12D1600 will generate data at the following rates:

Mode	Fclk [MHz]	Fs [MSPS]	Output Data Rate per Bank [MSPS]
DES 1:1 Non-Demux	1600	3200	1600
DES 1:2 Demux	1600	3200	800
Non-DES 1:1 Non-Demux	1600	1600	1600
Non-DES 1:2 Demux	1600	1600	800

Table 2. ADC12D1600 Output Data Rate example

The EVAL board is designed to be used with the Samtec ASP-65067-01 for the logic analyzer probe connection to the Agilent E5379A Differential Probe Adapter. There is also a footprint for the Agilent E5405A Pro Series Soft Touch Connectorless Probe, but this option is not recommended, as the signal integrity is better via the Samtec connector.

Optional Lab Equipment

If the EVAL board is being used in Extended Control Mode (ECM), then it is also necessary to have a system which can write to the SPI. One option is the Aardvark I2C/SPI Host Adapter and accessories.

- Aardvark I2C/SPI Host Adapter
http://www.totalphase.com/products/aardvark_i2cspi/
- Level Shifter Board
http://www.totalphase.com/products/level_shifter/
- 10-pin Split Cable
http://www.totalphase.com/products/split_cable/

3. Driving the Clock and Inputs

Driving the Sampling Clock

The CLK+/- SMA inputs are connected directly to the ADC; they must be driven AC-coupled and differentially. Therefore, a set of DC blocks is required at the input. To convert a single-ended signal to differential, a National Anaren balun board (400MHz - 3GHz) may conveniently be used.

Driving the Analog Inputs

The analog inputs may be driven AC-coupled and must be driven differentially. Depending upon the application, an amplifier or balun board may be used to achieve single-ended to differential conversion.

4. Jumper Settings

Most of the jumper pins on the EVAL board are also available for customer use, and are more clearly explained in the datasheet; some exceptions are the TEST pins as described below. These pins are related to internal test functions and are not available.

The ADC may be used in either Extended Control Mode (ECM) or Non-ECM, a.k.a “pin-control mode”; this is set by the ECEb pin. In ECM, the ADC modes and settings are written to via the Serial Port Interface. Some control pins remain active in ECM.

Pin (Board)	Pin (Datasheet)	I/O	Function
TEST_LP	N/A	N/A	Internal test function; do not connect
ECEB	ECEb	Input	ECM and Non-ECM: Extended Control Mode Enable bar select
TPN	TPM	Input	Non-ECM only: Test Pattern Mode select
NDM	NDM	Input	ECM and Non-ECM: Non-Demux Mode select
TEST_IO	N/A	N/A	Internal test function; do not connect
POR_EN	N/A	N/A	Internal test function; do not connect
DCLK_RST+/-	DCLK_RST+/-	Input	Differential DCLK Reset
DES	DES	Input	Non-ECM only: DES Mode select
LSPSM	LSPSM	Input	Low sampling power saving mode
DDR_PH	DDRPh	Input	Non-ECM only: DDR Phase select
FSR	FSR	Input	Non-ECM only: Full-Scale Range select
PDQ	PDQ	Input	ECM and Non-ECM: Power-Down Q-channel
PDI	PDI	Input	ECM and Non-ECM: Power-Down I-channel
SCSB	SCSb	Input	SPI: Serial Chip Select bar
SDO	SDO	Output	SPI: Serial Data Out
SDI	SDI	Input	SPI: Serial Data In
SCLK	SCLK	Input	SPI: Serial Clock
TEST_RSV1	N/A	N/A	Internal test function; do not connect
TEST_RSV2	N/A	N/A	Internal test function; do not connect
TDIODE	TDIODE+/-	Output	Temperature Sensor Diode terminals
CALRUN	CalRun	Output	Calibration Running indication
VBG	VBG	I/O	Bandgap Voltage Output / LVDS Common-mode Voltage select
TEST_CF	N/A	N/A	Internal test function; do not connect
RCLK	RCLK+/-	Input	AutoSync: Reference Clock Input
RCOUT1	RCOut1+/-	Output	AutoSync: Reference Clock Differential Output 1
RCOUT2	RCOut2+/-	Output	AutoSync: Reference Clock Differential Output 2

Table 3. Control pins and function

In Non-ECM, the following control pins are available.

Pin (Board)	Low	High	Floating
ECEB	ECM	Non-ECM	Not valid
TPN	Non-TPM	TPM	Not valid
NDM	1:2 Demux	1:1 NDM	Not valid
DES	Non-DES	DES	Not valid
LSPSM	Normal	Low sampling power saving	Not valid
DDR_PH	0° Mode	90° Mode	Not valid
FSR	See datasheet for details		Not valid
PDQ	Q-channel active	Power Down Q-channel	Not valid
PDI	I-channel active	Power Down I-channel	Not valid
VBG	N/A	Higher LVDS common-mode voltage	Lower LVDS common-mode voltage

Table 4. Non-ECM pin control settings

5. Board Power On

Refer to the individual product datasheets for information about ABS Max and operating conditions.

Power supply

For flexibility, each of the different ADC power supply pins has been brought out to a red PWR terminal. It is recommended that all supply pins be powered from a single power supply source. The supply voltage to any of the PWR terminals must not exceed that applied to X-1 PWR (VA). The supply voltage is a nominal 1.9V and should not exceed 2V.

Power on sequence

The ADC should be powered up in Non-ECM, by putting the ECEB pin high. The ADC does not have a Power on Reset. If the part is started in extended control mode (ECM), by having the ECEB pin low, the registers will come up in an unknown random state, and the part will be in an unknown operating condition. If ECM mode is desired, the board can be placed in ECM by moving the ECEB pin low after power up with the ECEB pin high.

After the board has stabilized the ADC should be calibrated by flipping the red CAL switch from low (CALb) to high (CAL). If the switch remains high, the part cannot be recalibrated in ECM. To enable the part to be recalibrated, in either ECM or with the switch, the CAL switch must be low (CALb). Recalibrate the part when there has been a major change in operating conditions, such as change in Fclk, or temperature.

The CLK+/- SMA inputs are connected directly to the ADC; they must be driven AC-coupled and differentially. Therefore, a set of DC blocks is required at the input. To convert a single-ended signal to differential, a National Anaren balun board (400MHz - 3GHz) may conveniently be used.

6. Samtec Connector

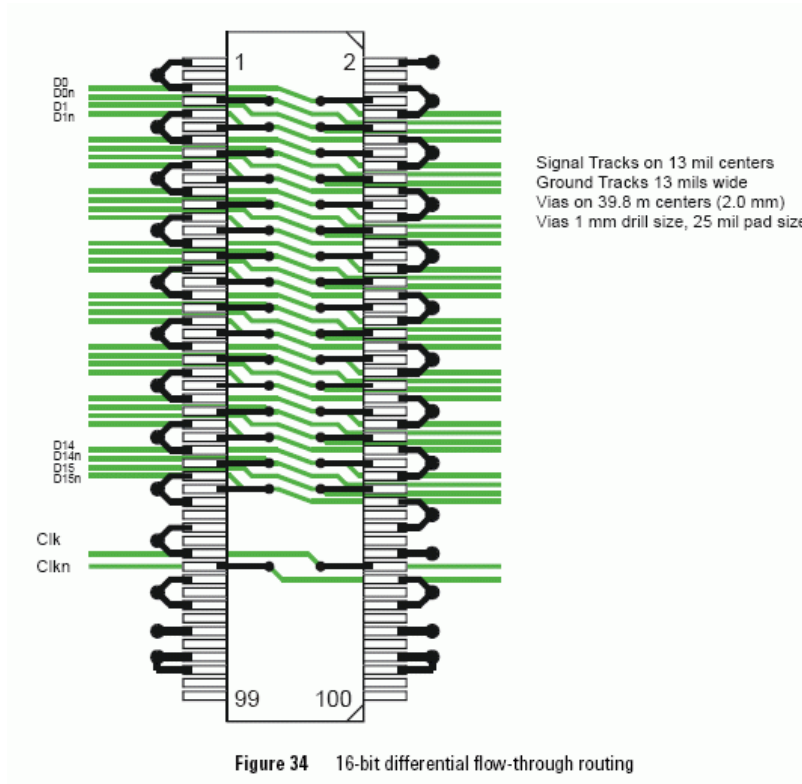


Figure 2 Flow-through routing for the Samtec connector

Footprint dimensions

Use the following 100-pin **Samtec** connector footprint and support shroud mounting hole dimensions to design your target system board.

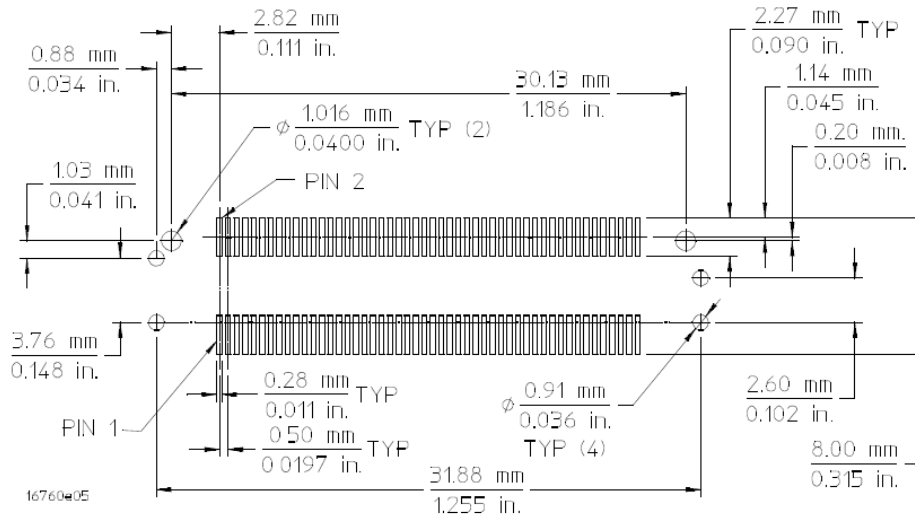


Figure 8 100-pin Samtec connector footprint and support shroud mounting hole dimensions

Figure 3. Samtec connector footprint

Ordering Probing Connectors and Shrouds

Connectors and shrouds may be ordered in kits or ordered separately. Select a support shroud appropriate for the thickness of your PC board. The following table lists the Agilent part numbers for each.

CAUTION The support shrouds marked with an asterisk in the following table are made of conductive metal. Care should be taken to avoid shorting adjacent boards or components with the shrouds. For this reason it may be advisable not to connect the shrouds to ground.

For Probe Model #	Agilent Part Number	Consists of	For Target PC Board Thickness
E5378A & E5379A	16760-68702	5 Mating Connectors &	up to 1.57 mm (0.062 in.)
	16760-68703	5 Support Shrouds*	up to 3.05 mm (0.120 in.)

E5379A Differential Probe				E5379A Differential Probe			
Negative Signals		Positive Signals		Negative Signals		Positive Signals	
Signal Name	Pin#	Signal Name	Pin#	Signal Name	Pin#	Signal Name	Pin#
Ground	1	Ground	2	Ground	57	Ground	58
Do Not Connect	3	Do Not Connect	4	D13 n	59	D13 p	60
Ground	5	Ground	6	Ground	61	Ground	62
D0N	7	D0 p	8	D14 n	63	D14 p	64
Ground	9	Ground	10	Ground	65	Ground	66
D1 n	11	D1 p	12	D15 n	67	D15 p	68
Ground	13	Ground	14	Ground	69	Ground	70
D2 n	15	D2 p	16	NC	71	NC	72
Ground	17	Ground	18	Ground	73	Ground	74
D3 n	19	D3 p	20	NC	75	NC	76
Ground	21	Ground	22	Ground	77	Ground	78
D4 n	23	D4 p	24	D16/Clk n	79	D16/Clk p	80
Ground	25	Ground	26	Ground	81	Ground	82
D5 n	27	D5 p	28	NC	83	NC	84
Ground	29	Ground	30	Ground	85	Ground	86
D6 n	31	D6 p	32	NC	87	Ground	88
Ground	33	Ground	34	N/C	89	N/C	90
D7 n	35	D7 p	36	NC	91	NC	92
Ground	37	Ground	38	Ground	93	Ground	94
D8 n	39	D8 p	40	Ground	95	Ground	96
Ground	41	Ground	42	Do not connect	97	Do not connect	98
D9 n	43	D9 p	44	Do not connect	99	Do not connect	100
Ground	45	Ground	46				
D10 n	47	D10 p	48				
Ground	49	Ground	50				
D11 n	51	D11 p	52				
Ground	53	Ground	54				
D12 n	55	D12 p	56				

Figure 4. Samtec connector ordering information

7. Using the Aardvark

The Aardvark I2C/SPI Host Adapter is a fast and powerful I2C bus and SPI bus host adapter through USB (see Figure 6). It allows a developer to interface a Linux or Windows PC to a downstream embedded system environment and transfer serial messages using the I2C and SPI protocols.

Part Number: TP240141

RoHS Compliant: Yes



Figure 5. Aardvark I2C/SPI Host Adapter

For more information please visit the manufacturer website at: http://www.totalphase.com/products/aardvark_i2cspi/

Level translation is required due to the different signaling levels (3.3V for the Aardvark vs. 1.9V for the ADC). A level shifter can be obtained from Total Phase or can be built as shown Figure 6.

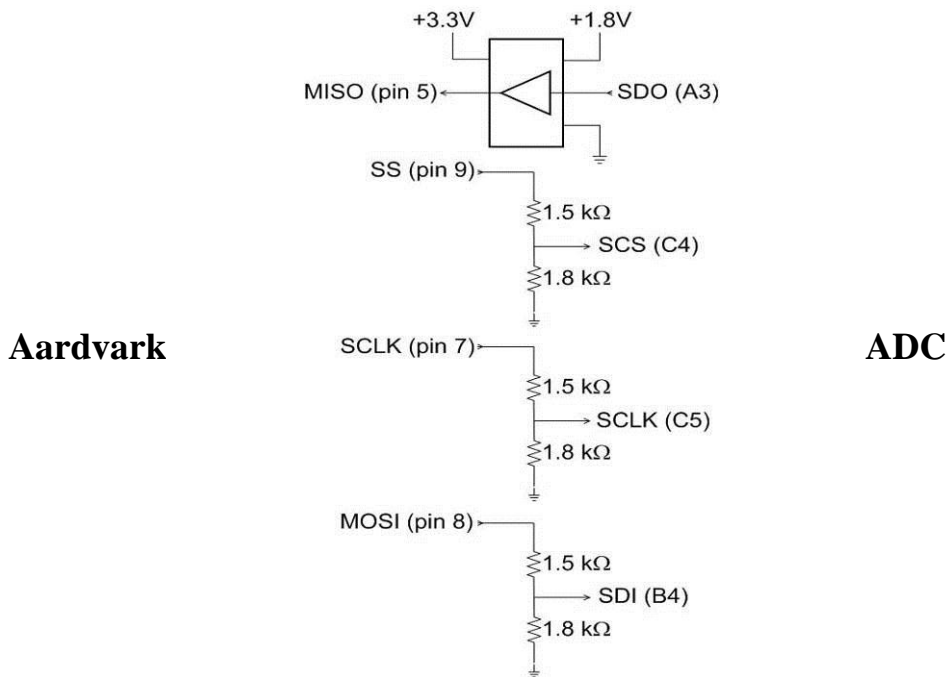
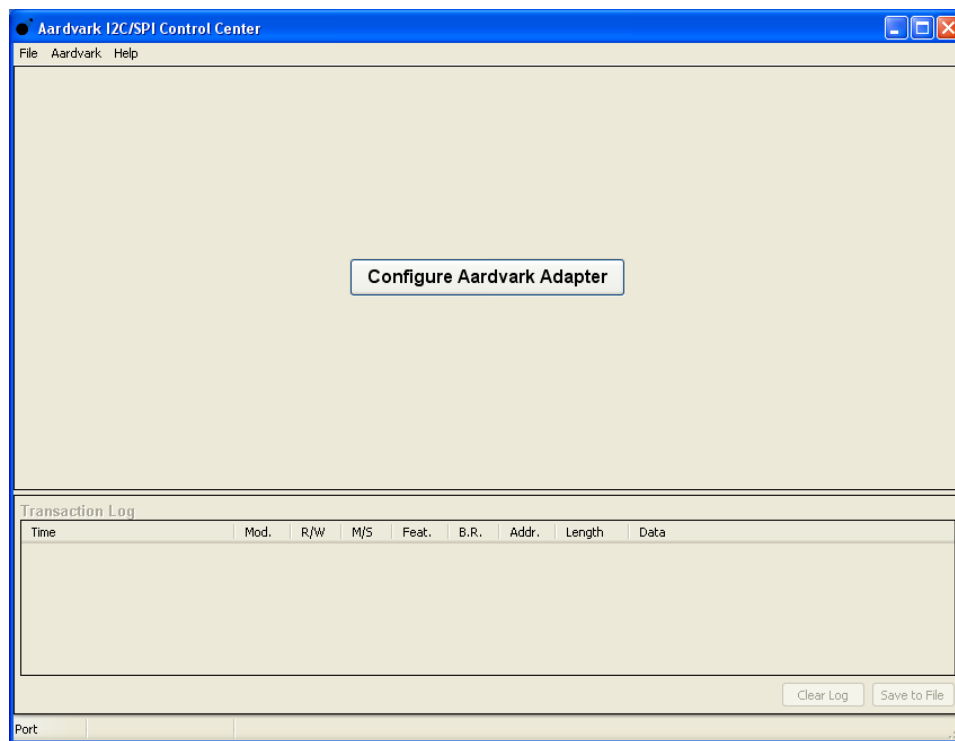
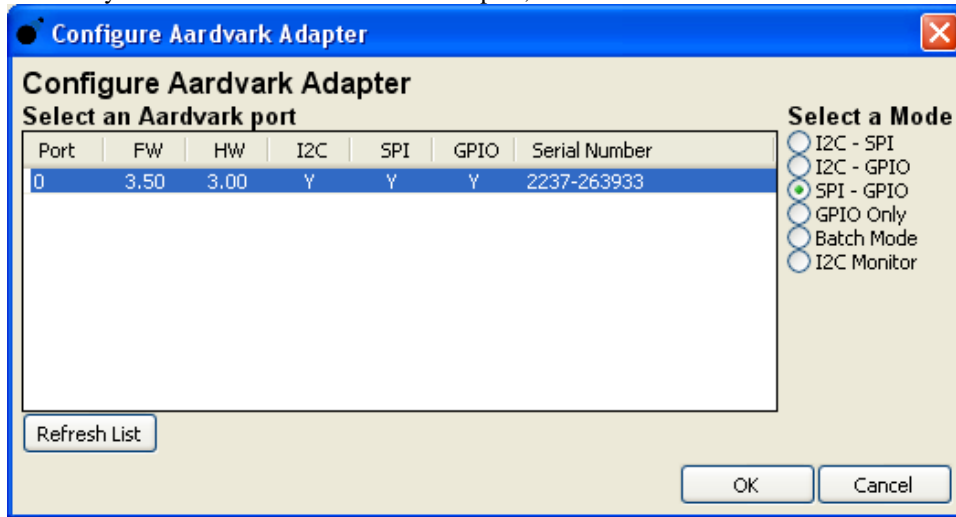


Figure 6. Level translator for Aardvark to ADC

1. Download the Aardvark control GUI software
 - a. Go to: http://www.totalphase.com/products/aardvark_i2cspi/ and select the *Downloads* tab.
 - b. Download and install the *Control Center Software*.
2. Configure and connect the hardware
 - a. Put the ADC into Extended Control Mode (ECM) by setting the ECEB jumper to GND.
 - b. The I2C/SPI Level Shifter board should have jumpers at TPWR, MASTER, and 1.8V. (The Gig ADC runs at 1.9V, but 1.8V is appropriately close.)
 - c. Connect a USB cable from the PC to the Aardvark
 - d. Connect the Aardvark cable to the I2C/SPI Level Shifter board, ADAPTER input
 - e. Connect the additionally supplied ribbon cable from the I2C/SPI Level Shifter board, TARGET1 port to the ribbon cable with split outputs
 - f. Connect the split output wires to the ADC EVAL board
 - i. SS (white) = SCSb
 - ii. MOSI (grey) = SDI
 - iii. SCLK (purple) = SCLK
 - iv. GND (black) = GND
3. Configure the Aardvark software
 - a. Select *Configure Aardvark Adapter*



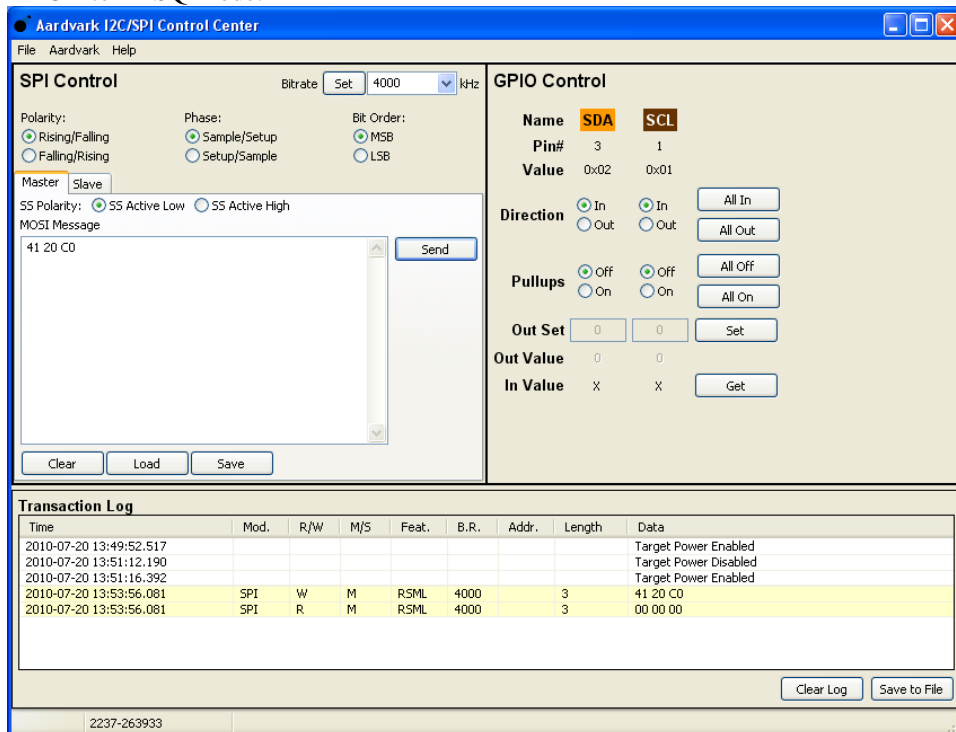
- b. Select anywhere on the row of the available port, select the SPI – GPIO radio button and hit OK



- c. In the Aardvark I2C/SPI Control Center software, select *Aardvark* → *Target Power*. On the I2C/SPI Level Shifter board, both LEDs for TARGET (orange) and POWER (green) should light up.

4. Using the software

- a. Type the command (hex) in the MOSI Message window and hit the Send button. For example, putting the ADC into DESQ Mode:



5. Tips and tricks

- a. During the entire time the ADC is being used in SPI Mode (a.k.a. Extended Control Mode), the jumper on the EVAL board for ECEB stays connected to GND. Moving the ECEB jumper from GND to VA back to GND again is a short-cut to reset the SPI registers back to their default values
- b. The Calibration pin is OR'd with the Calibration bit in the SPI internally to the ADC, i.e. the pin remains active when the ADC is in ECM. To calibrate the ADC, it is more convenient to use the Calibration pin (move the jumper from GND to VA and back to GND) than to write the SPI twice.

8. Importing data into WaveVision5

The data from the Logic Analyzer has the following (or similar) format:

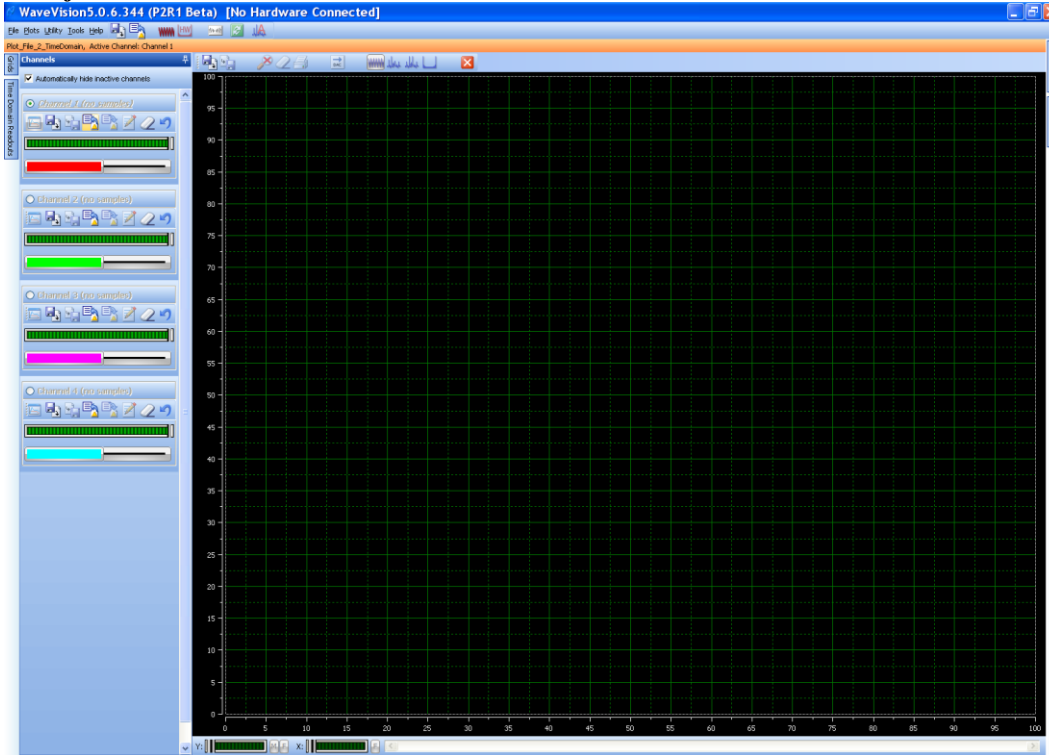
Listing(Listing<1>) - 28 October 2010 (21:54)

State Number Decimal	DId Hex	DI Hex	DQ Hex	DQd Hex	ORI Binary	ORQ Binary
0	2B	24	80	80	0	1
1	D3	DC	80	80	0	1
2	2E	22	80	80	0	1
3	D1	DE	80	80	0	1
4	30	20	80	80	0	1
5	CE	E0	80	80	0	1
6	33	1E	80	80	0	1
7	CC	E3	80	80	0	1
8	35	1C	80	80	0	1
9	C9	E4	80	80	0	1
10	38	1A	80	80	0	1

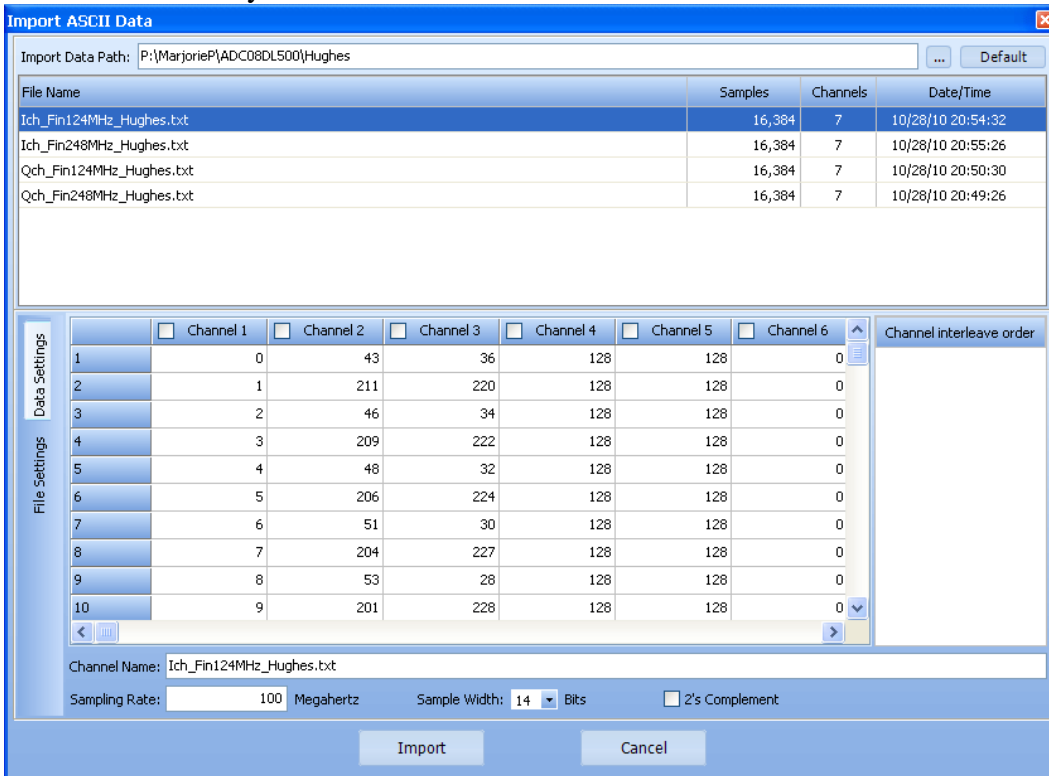
When the data is imported into WaveVision, it is necessary to make selections about how the data was taken, so that it can be correctly reconstructed. Some of these selections are: Demux / Non-Demux Mode, DES / Non-DES Mode, Hexadecimal / Binary / Decimal, Sampling Rate, and Number of Bits. For example, this data was taken on the I-channel in Demux, Non-DES Mode in the Hexadecimal format.

For Non-DES Mode, the data is ordered {DId, DI} or {DQd, DQ}. For DES Mode, the data is ordered {DQd, DId, DQ, DI}.

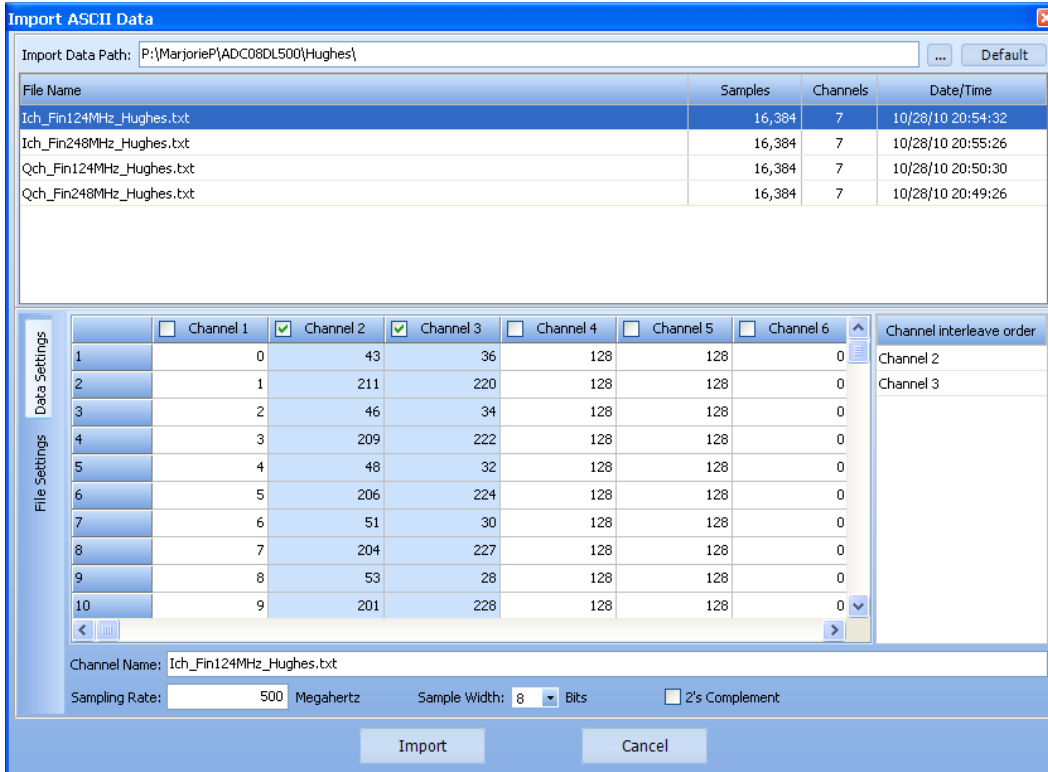
- To import data, select *Channels* → *Import WaveVision 4 data or a single/double column ASCII data file*



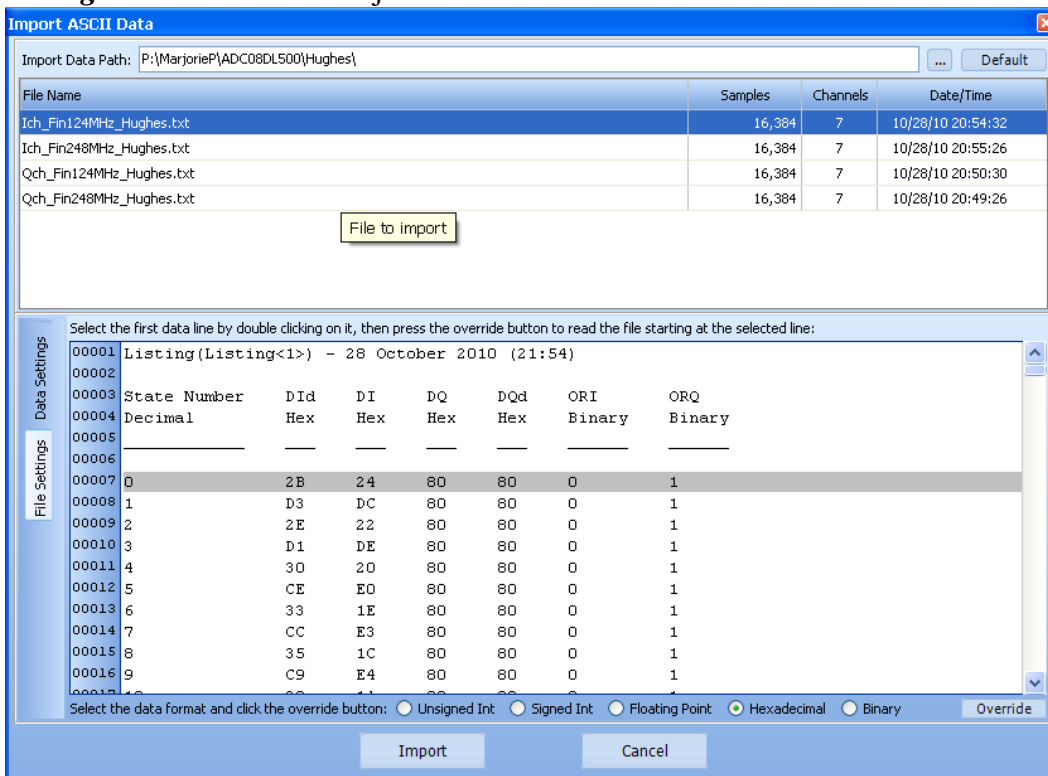
- Select the Import Data Path. Note that this can take a few moments if there are many or large data files in the directory.



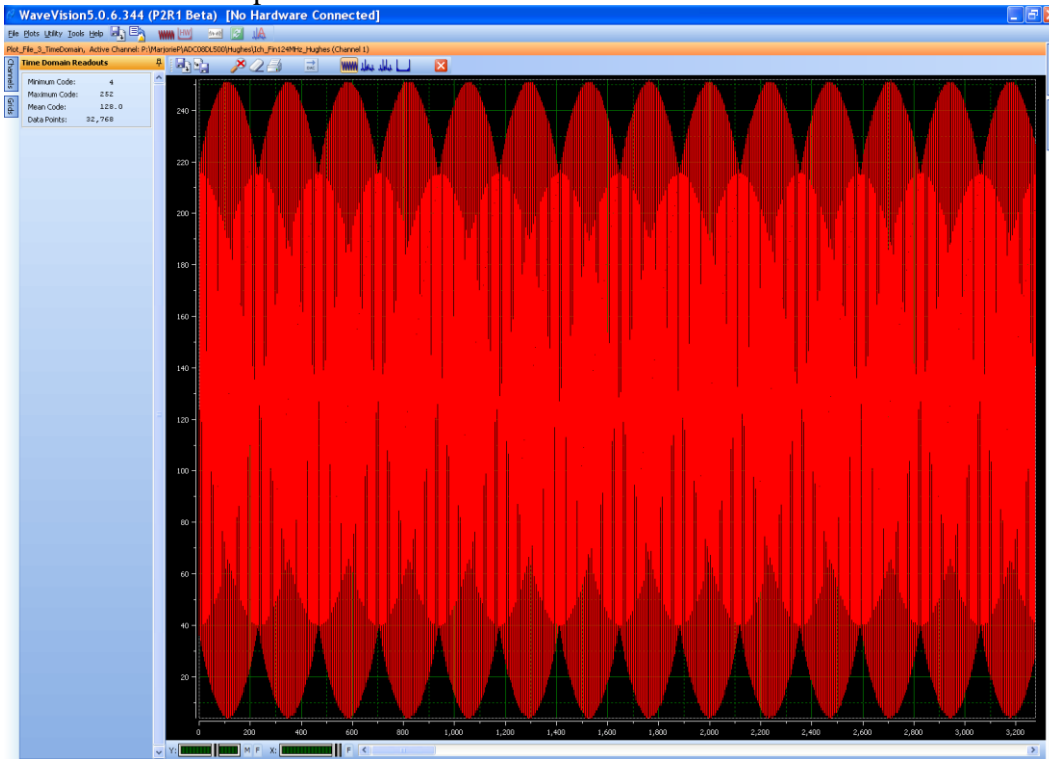
3. Select the Sampling Rate, Sample Width, channels with data (Channel 2, 3 in this example), and the Channel interleave order.



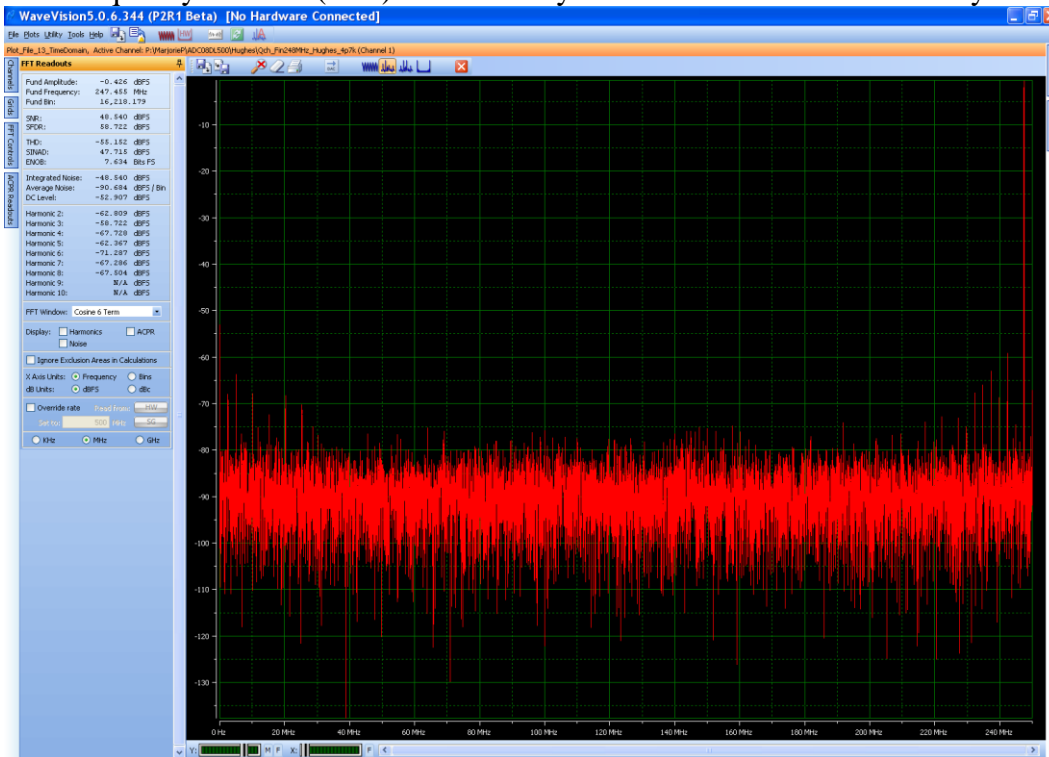
4. To verify the channel headings or override the automatically selected data format, select the **File Settings** tab and make the adjustments.



5. The data will be imported into the Time Domain view:



6. The Frequency Domain (FFT) as well as Dynamic Performance metrics may also be selected:



EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 4.0V to +75V; a supply voltage (V_s) range of +4.5V to +75V; and the output voltage range of GND + 0.05V to ($V_s - 0.4V$ or 13.6 – whichever is less). Total dissipation of the TI installed sense resistor shall not exceed 0.5W. Turret terminals are rated for 5A max.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than +25°C. The EVM is designed to operate properly with certain components above +25°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

EVALUATION BOARD/KIT/MODULE (EVM) ADDITIONAL TERMS

Texas Instruments (TI) provides the enclosed Evaluation Board/Kit/Module (EVM) under the following conditions:

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING LIMITED WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For additional information on TI's environmental and/or safety programs, please visit www.ti.com/esh or contact TI.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used. TI currently deals with a variety of customers for products, and therefore our arrangement with the user is not exclusive. TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.

REGULATORY COMPLIANCE INFORMATION

As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

For EVMs **not** subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant

Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concerning EVMs including detachable antennas

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

Concernant les EVMs avec appareils radio

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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EVALUATION BOARD/KIT/MODULE (EVM) WARNINGS, RESTRICTIONS AND DISCLAIMERS

For Feasibility Evaluation Only, in Laboratory/Development Environments. Unless otherwise indicated, this EVM is not a finished electrical equipment and not intended for consumer use. It is intended solely for use for preliminary feasibility evaluation in laboratory/development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems and subsystems. It should not be used as all or part of a finished end product.

Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.
2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard.
3. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.
4. You will take care of proper disposal and recycling of the EVM's electronic components and packing materials.

Certain Instructions. It is important to operate this EVM within TI's recommended specifications and environmental considerations per the user guidelines. Exceeding the specified EVM ratings (including but not limited to input and output voltage, current, power, and environmental ranges) may cause property damage, personal injury or death. If there are questions concerning these ratings please contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, some circuit components may have case temperatures greater than 60°C as long as the input and output are maintained at a normal ambient operating temperature. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during normal operation, please be aware that these devices may be very warm to the touch. As with all electronic evaluation tools, only qualified personnel knowledgeable in electronic measurement and diagnostics normally found in development environments should use these EVMs.

Agreement to Defend, Indemnify and Hold Harmless. You agree to defend, indemnify and hold TI, its licensors and their representatives harmless from and against any and all claims, damages, losses, expenses, costs and liabilities (collectively, "Claims") arising out of or in connection with any use of the EVM that is not in accordance with the terms of the agreement. This obligation shall apply whether Claims arise under law of tort or contract or any other legal theory, and even if the EVM fails to perform as described or expected.

Safety-Critical or Life-Critical Applications. If you intend to evaluate the components for possible use in safety critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, such as devices which are classified as FDA Class III or similar classification, then you must specifically notify TI of such intent and enter into a separate Assurance and Indemnity Agreement.

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ADC12D1XXX Evaluation Board

SPECIAL NOTES

These schematics reflect the current state of product development. This design had NOT yet been fully tested at the time these schematics were generated.


Since this product is in development, the user of this document is strongly advised to check for the latest revision.

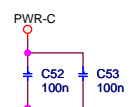
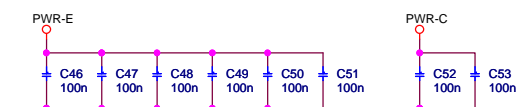
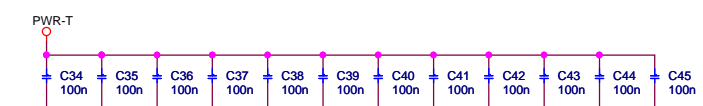
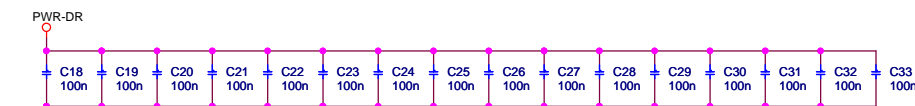
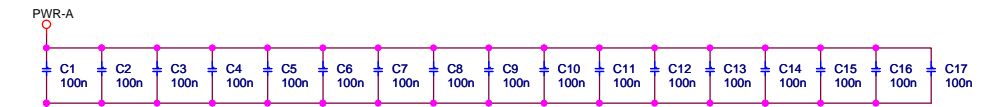
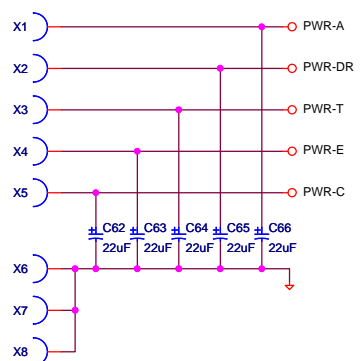
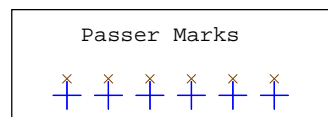
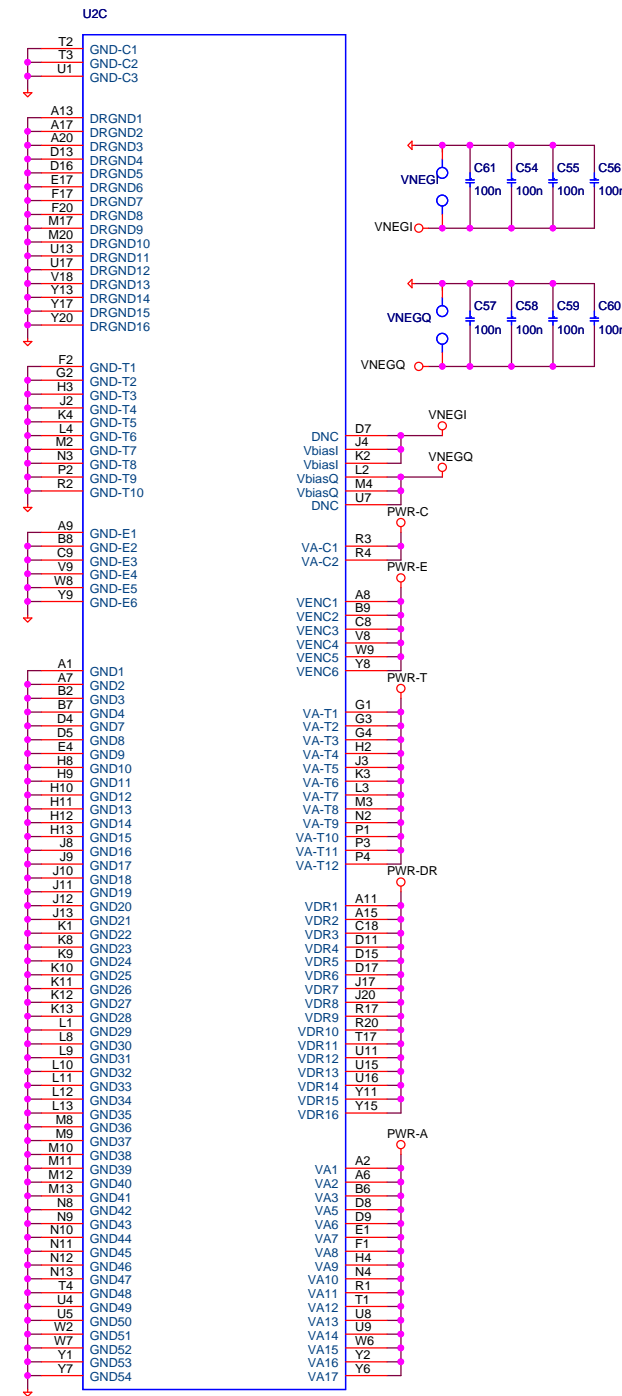
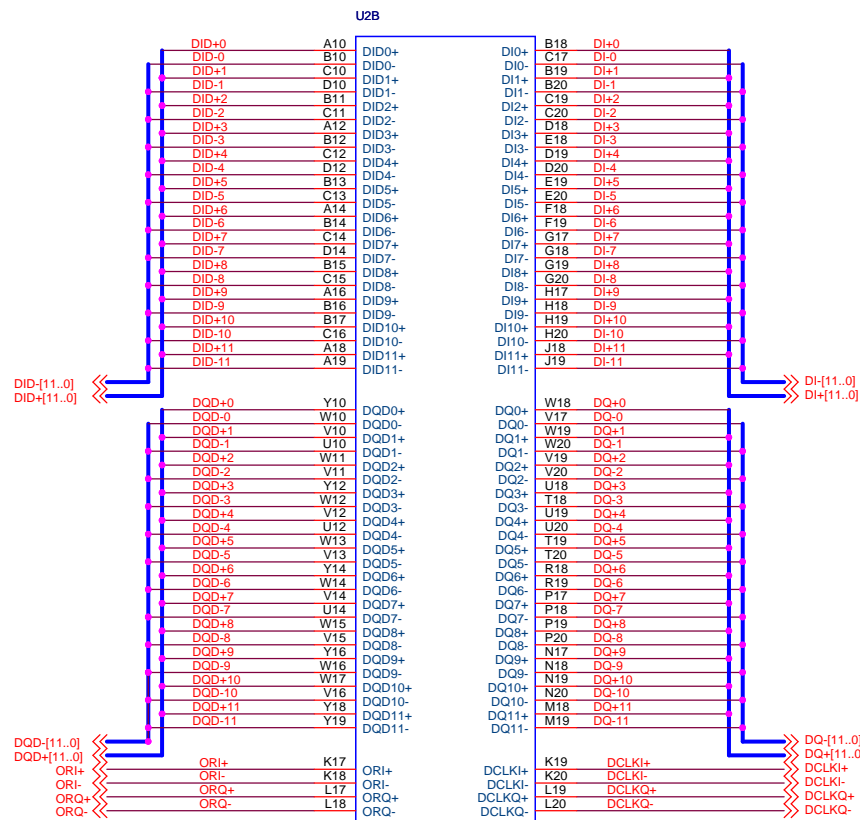
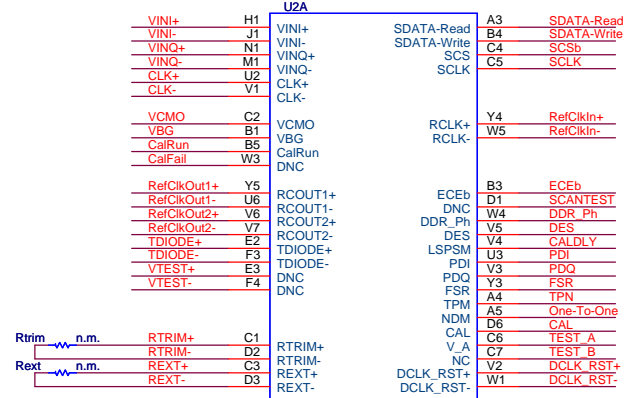
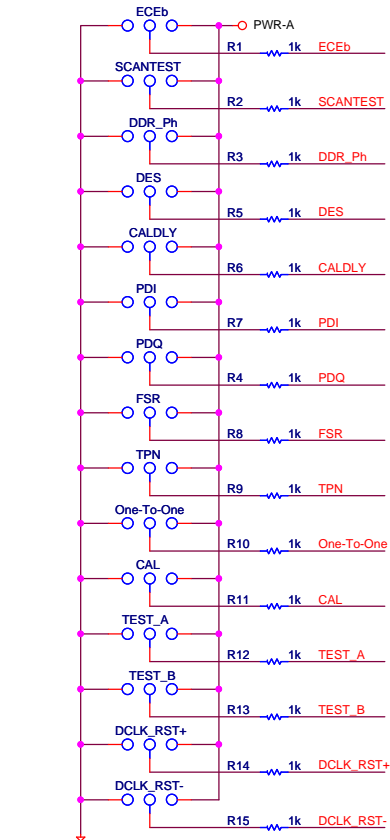
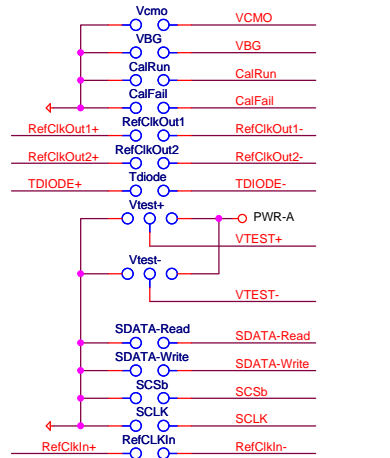
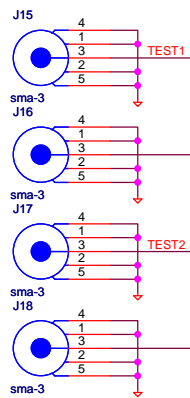
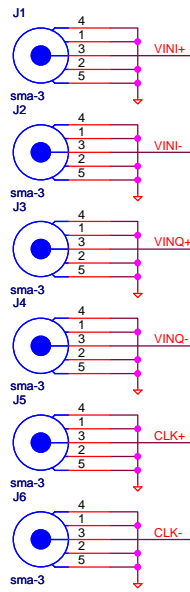
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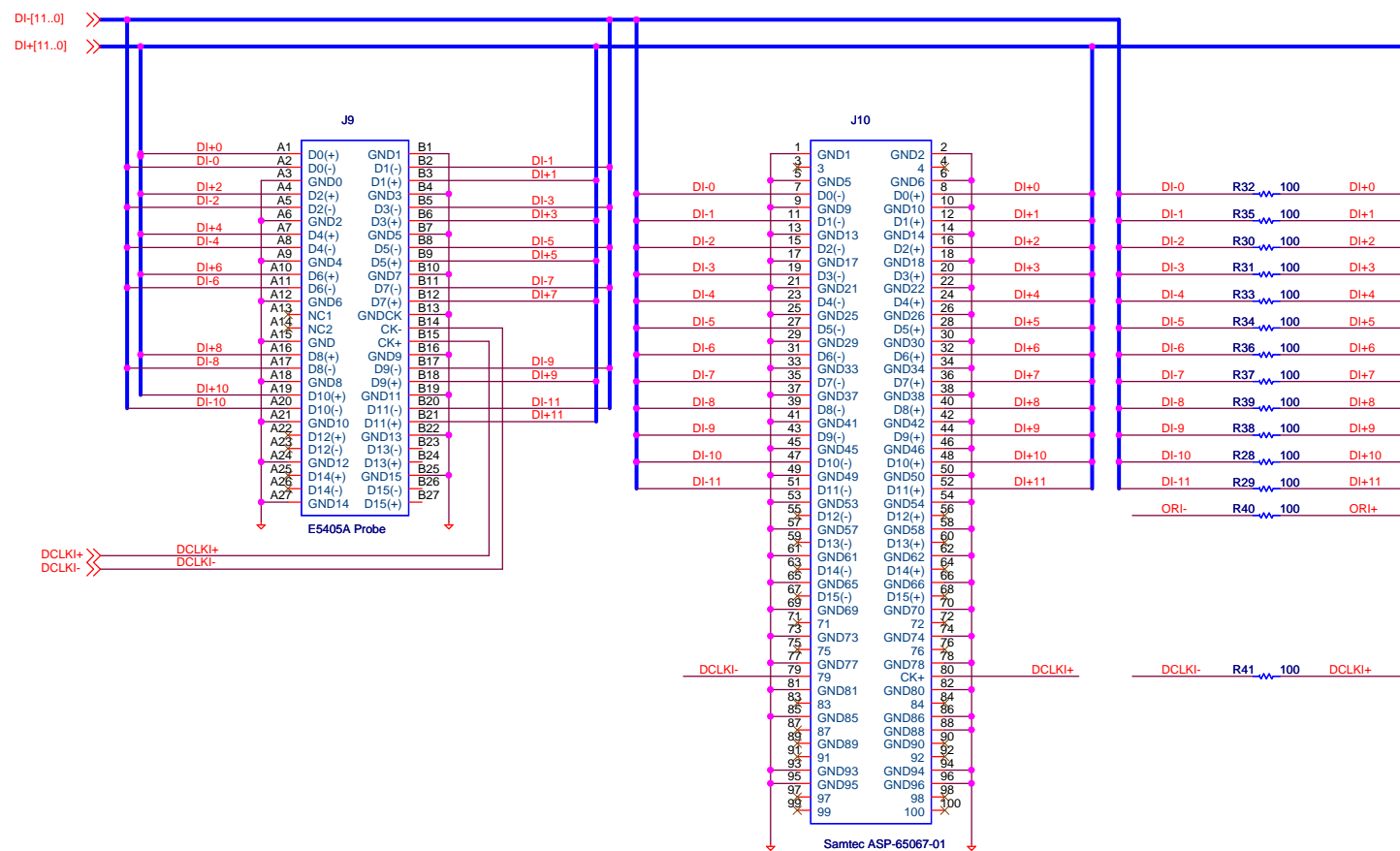
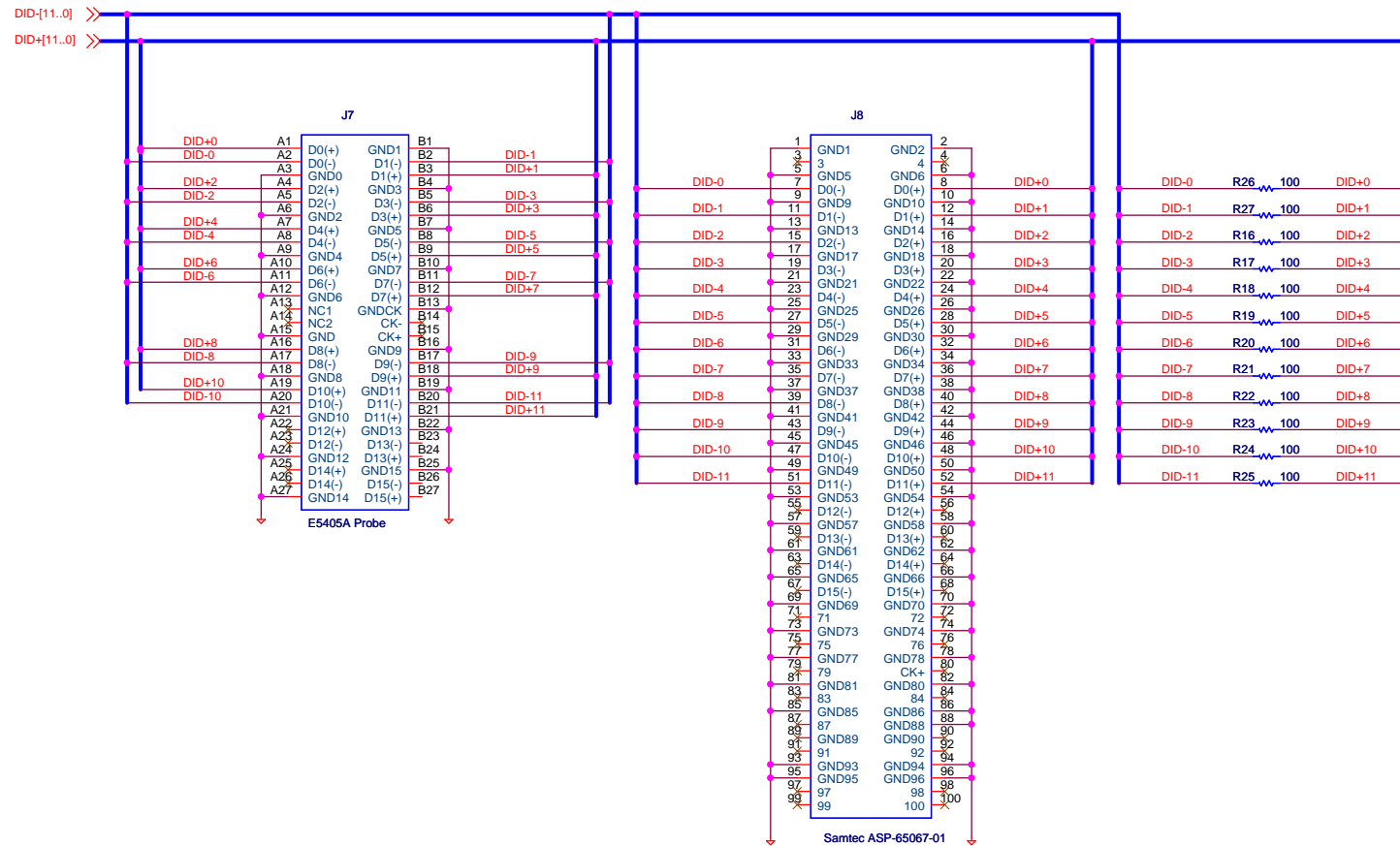
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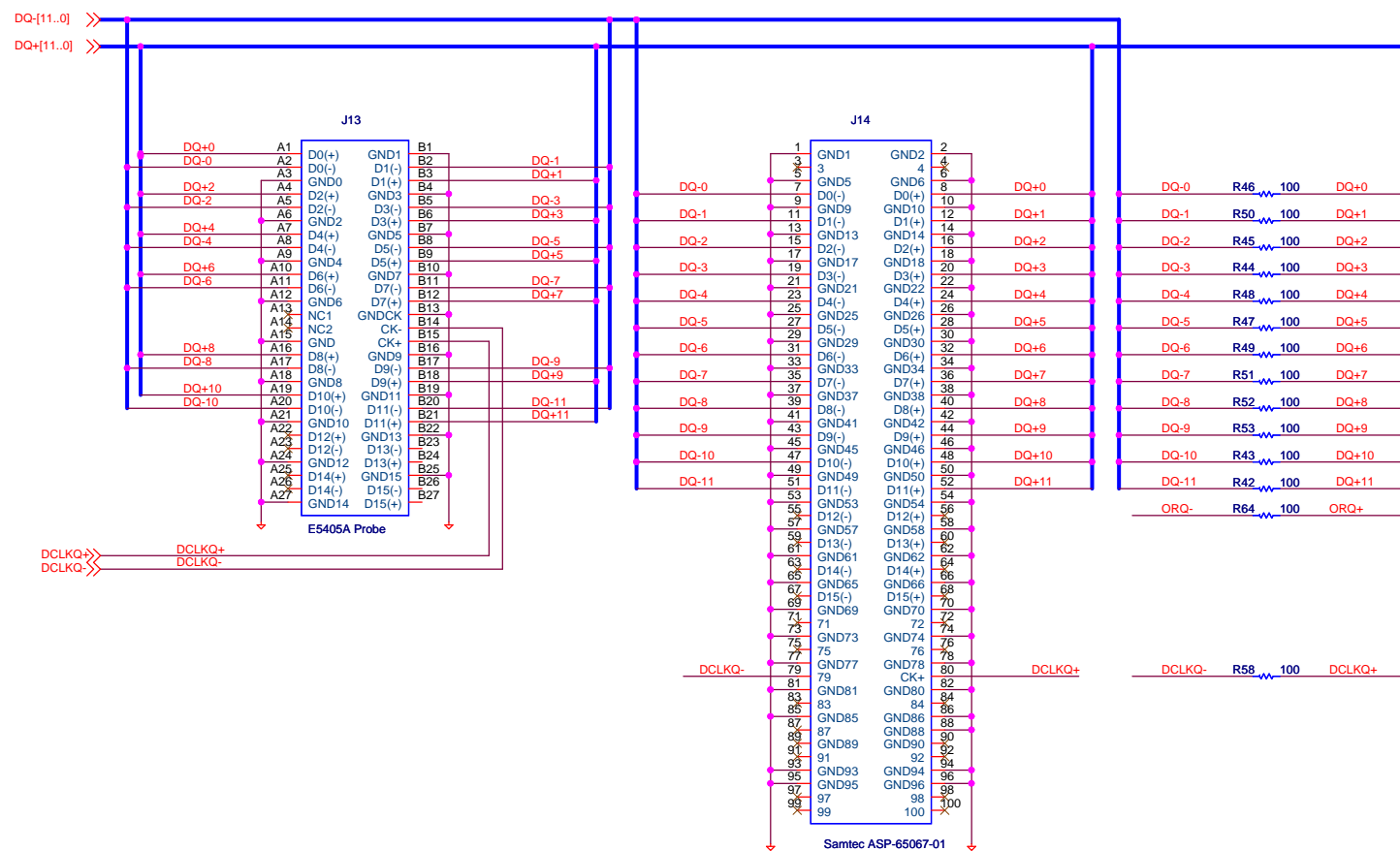
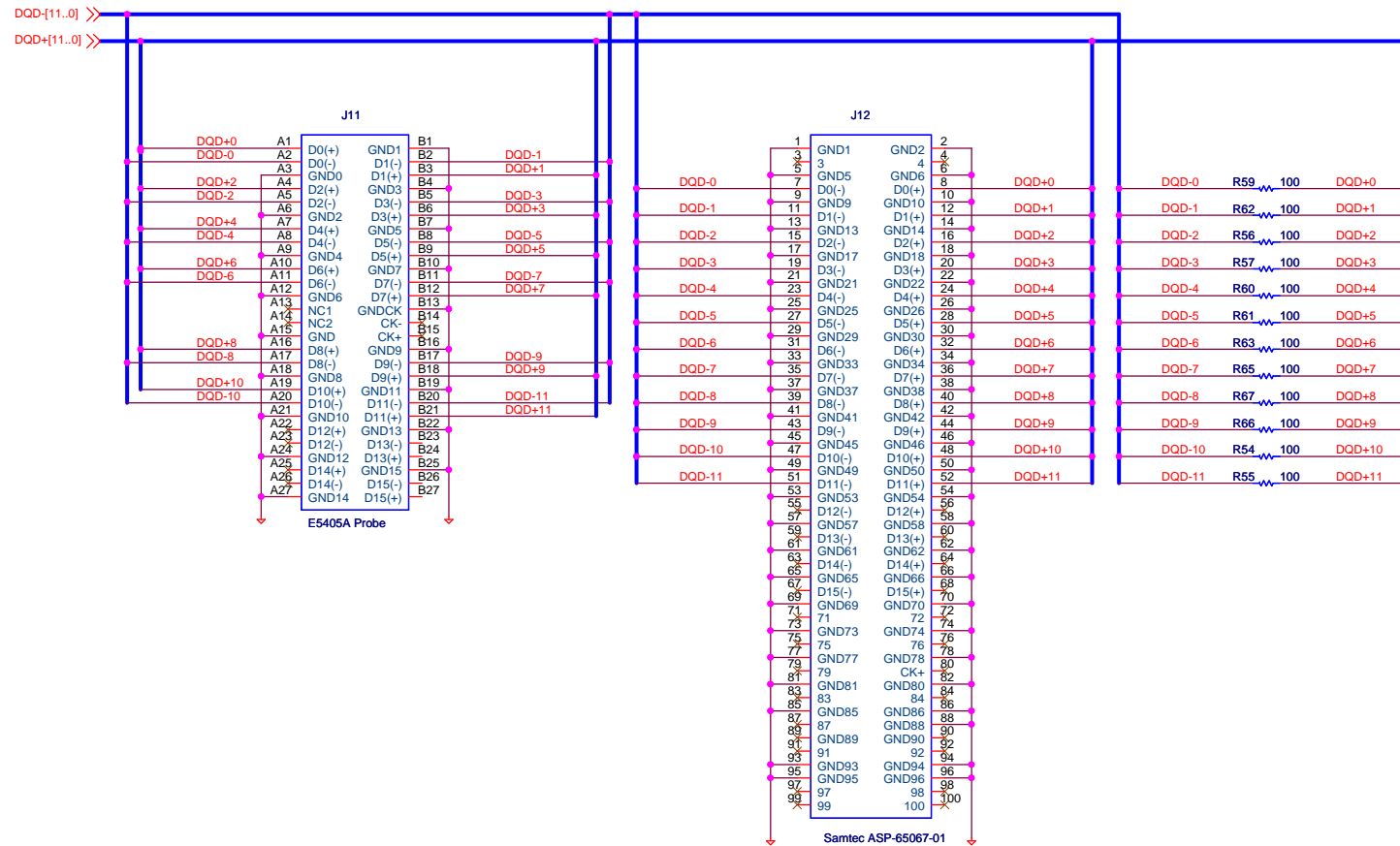
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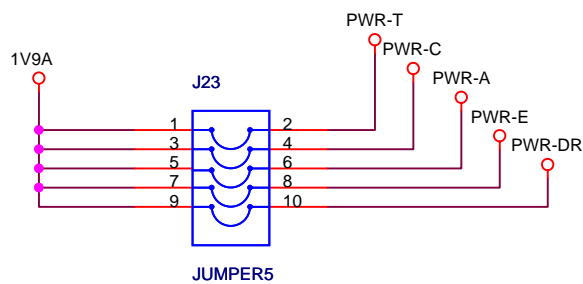
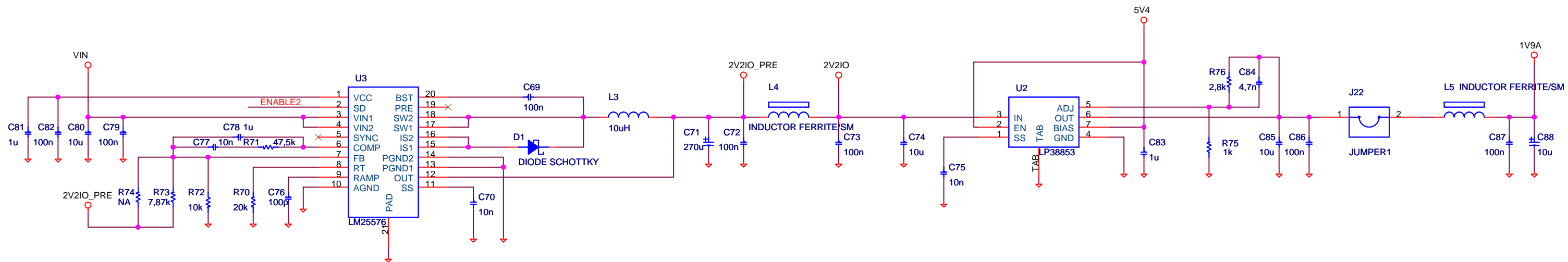
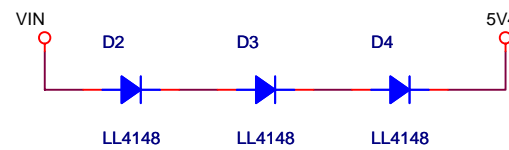
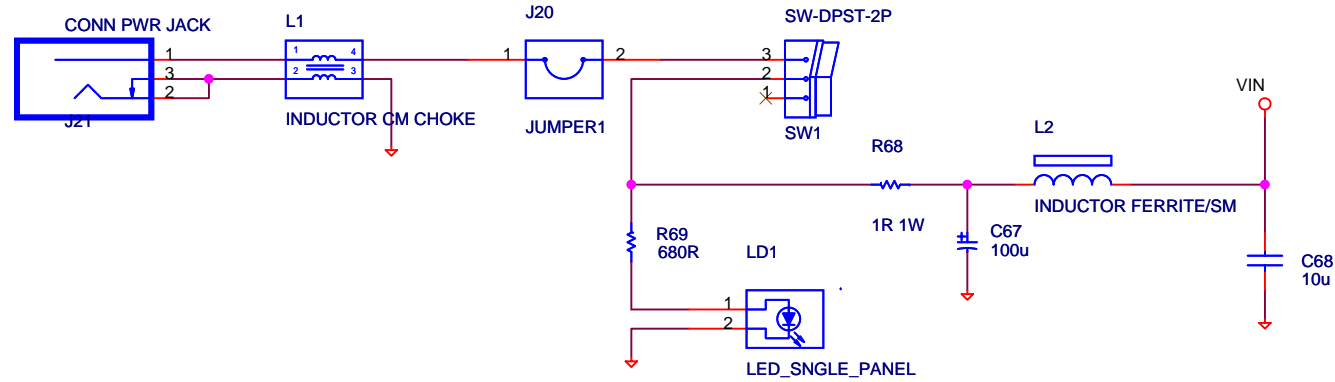
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