C185EKV01 User's Guide

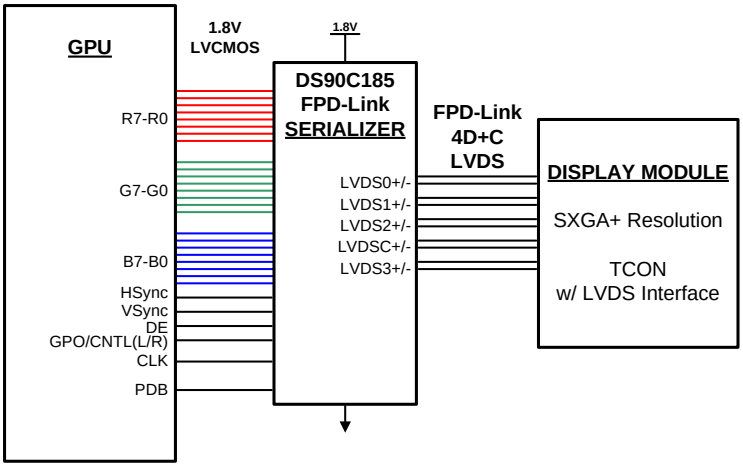
CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. Introduction

The Texas Instruments C185EVK01 evaluation module (EVK) helps designers evaluate the operation and performance of the DS90C185 Low Power 1.8V FPD-Link (LVDS) Serializer. The device operates off of a single 1.8V supply and supports input pixel clocks from 25 MHz to 105 MHz.



The EVM contains one Low Power 1.8V FPD-Link (LVDS) Serializer (See Table 1).

Table 1: Device and Package Configurations

SERIALIZER	IC	PACKAGE
U1	DS90C185SQ	SQF48A

2. Setup

This section describes the jumpers and connectors on the EVK as well and how to properly connect, set up and use the C185EVK01.

2.1. Input/Output Connector Description

JP1 – PDB is the jumper used to enable the Serializer. Power Down Bar (PDB) set to logic HIGH enables the device, while connecting this jumper to logic LOW will disable the device.

JP2 – VODSEL is the jumper that controls the differential output voltage. When VODSEL is set to logic HIGH, the output launch amplitude of the LVDS drivers will be set to have a larger output swing. If this jumper is set to logic LOW, then the LVDS drivers will be configured to have a power saving smaller output swing.

JP3 – RFB is the jumper that selects the clock edge that the input LVCMOS data will be sampled on. If RFB is logic HIGH, the input data is latched on the RISING EDGE of the pixel clock. If RFB is set to logic LOW, the input data is latched on the FALLING EDGE of the pixel clock.

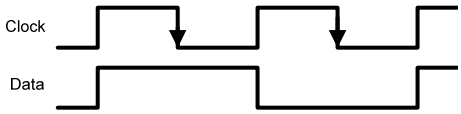


Figure 1: Falling Edge Data Strobe

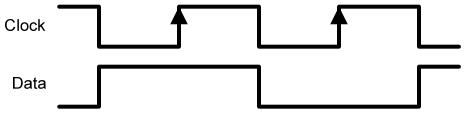


Figure 2: Rising Edge Data Strobe

JP4 – 18B_MODE is the jumper used to enable a power saving mode for 18-bit color applications. When this jumper is set to logic LOW, all data inputs will be sampled, serialized and driven out through the LVDS drivers to support 24-bit color applications or 28-bit generic data buses. If this jumper is set to logic HIGH, the device will enter a power saving mode that will power down the circuitry that feeds the 4th LVDS driver. In this mode the 4th LVDS driver, TxOUT3+/- will be TRI-STATE®.

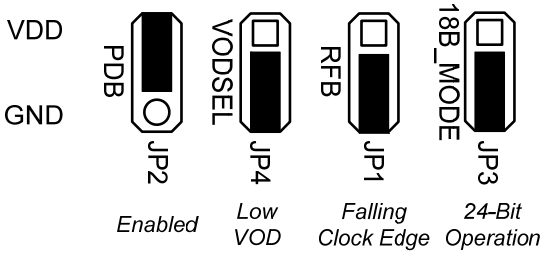


Figure 3: Default Jumper Settings

J1 – LVDS OUTPUTS are brought out to a 2 x10 bank of header pins. Note that each LVDS output is separated from adjacent LVDS signals by one ground pin. By default, 100 ohm termination resistors are soldered onto the EVM to allow for easy measuring and probing of the LVDS signals. **If a cable is connected to J1, these termination resistors (R57, R58, R62, R63, R64) must be removed or the differential voltage swing will be reduced.**

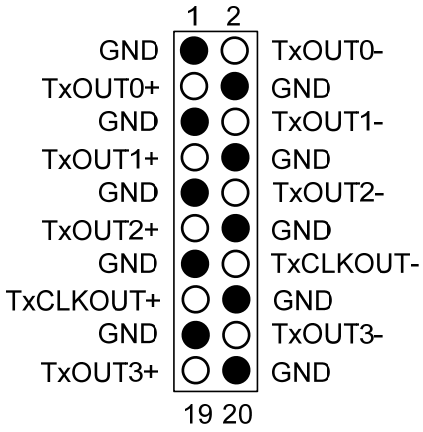


Figure 4: LVDS Output Connections (J1)

J2 – LVCMOS INPUTS are connected to the 2 x 30 bank of header pins. Note that each LVCMOS signal is paired with a ground signal. When attaching external test equipment or other hardware to this board it is important that there be sufficient ground connections to ensure good signal integrity for the input clock and data waveforms. There is a provision to populate 50 ohm terminations if needed.

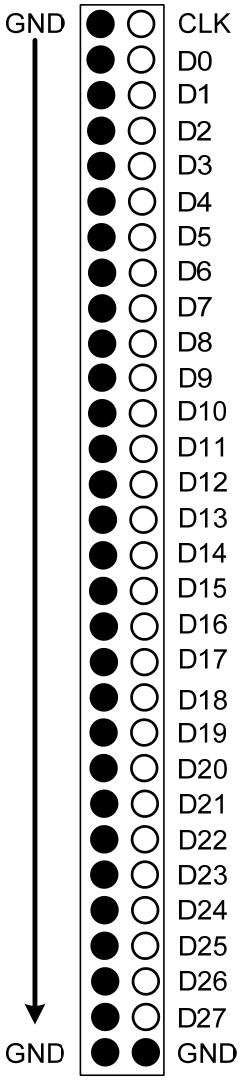


Figure 5: LVCMOS Input Connections (J2)

J3 – VDD is the terminal where 1.8V power should be applied.

J4 – GND is the terminal where ground should be applied.

2.2. System Setup

The input power jack (J3) should receive a voltage within the range of 1.71 V to 1.89 V. Once, power has been applied to the board, the PDB pin can be set to logic HIGH. After setting the PDB pin to HIGH, 1.8V clock and data can be transmitted to the EVM. **If a cable is connected to J1, the termination resistors (R57, R58, R62, R63, R64) should be removed.**

2.3. Operation

For proper operation of the DS90C185, JP1, JP2, JP3 and JP4 should be properly configured by using shorting blocks (jumpers); see Figure 3.

JP1 to HIGH, after power on
JP2 to LOW for reduced VOD swing or HIGH for large VOD swing
JP3 to LOW for falling clock edge strobe or HIGH for rising clock edge strobe
JP4 to LOW for 24-bit color (28-bit data bus) or to HIGH for 18-bit color (21-bit data bus)

After applying power and setting JP1 to HIGH, a clock signal can be sent to the DS90C185. When the clock signal is detected, the DS90C185 will power on and begin to transmit serialized LVDS data.
.

3. Board Layout

Figure 4, Figure 5 and Figure 6 show the board layout for the C185EV01 printed circuit board. The EVM offers jumpers to configure and power on/off the DS90C185. Resistor pads are provided so that 50 ohm shunt terminations can be implemented when interfacing with external video (data) generators with 50 ohm signal sources. 100 ohm differential termination resistors are populated by default to allow for probing of the LVDS outputs at J1.

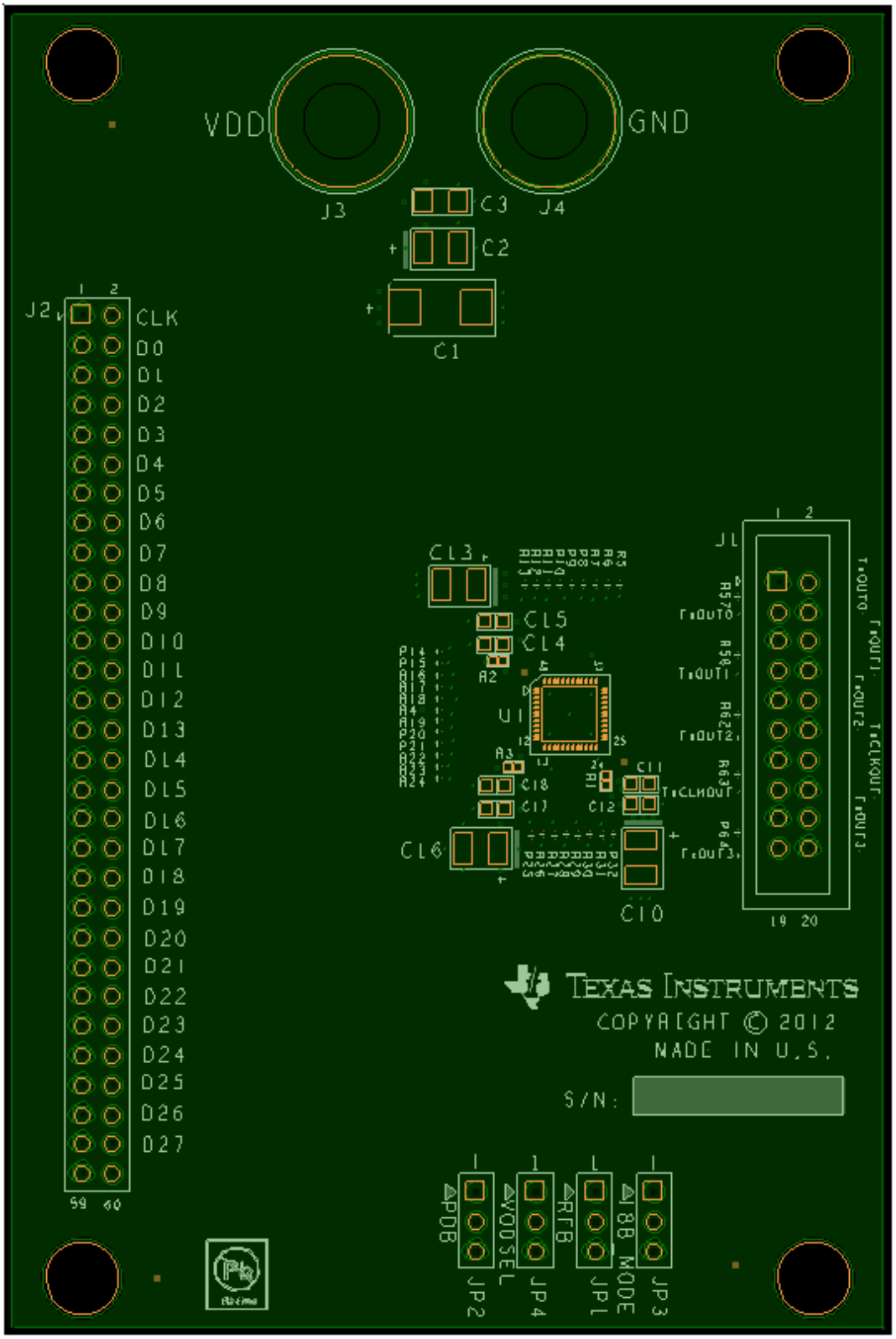


Figure 6: Top Assembly Layer

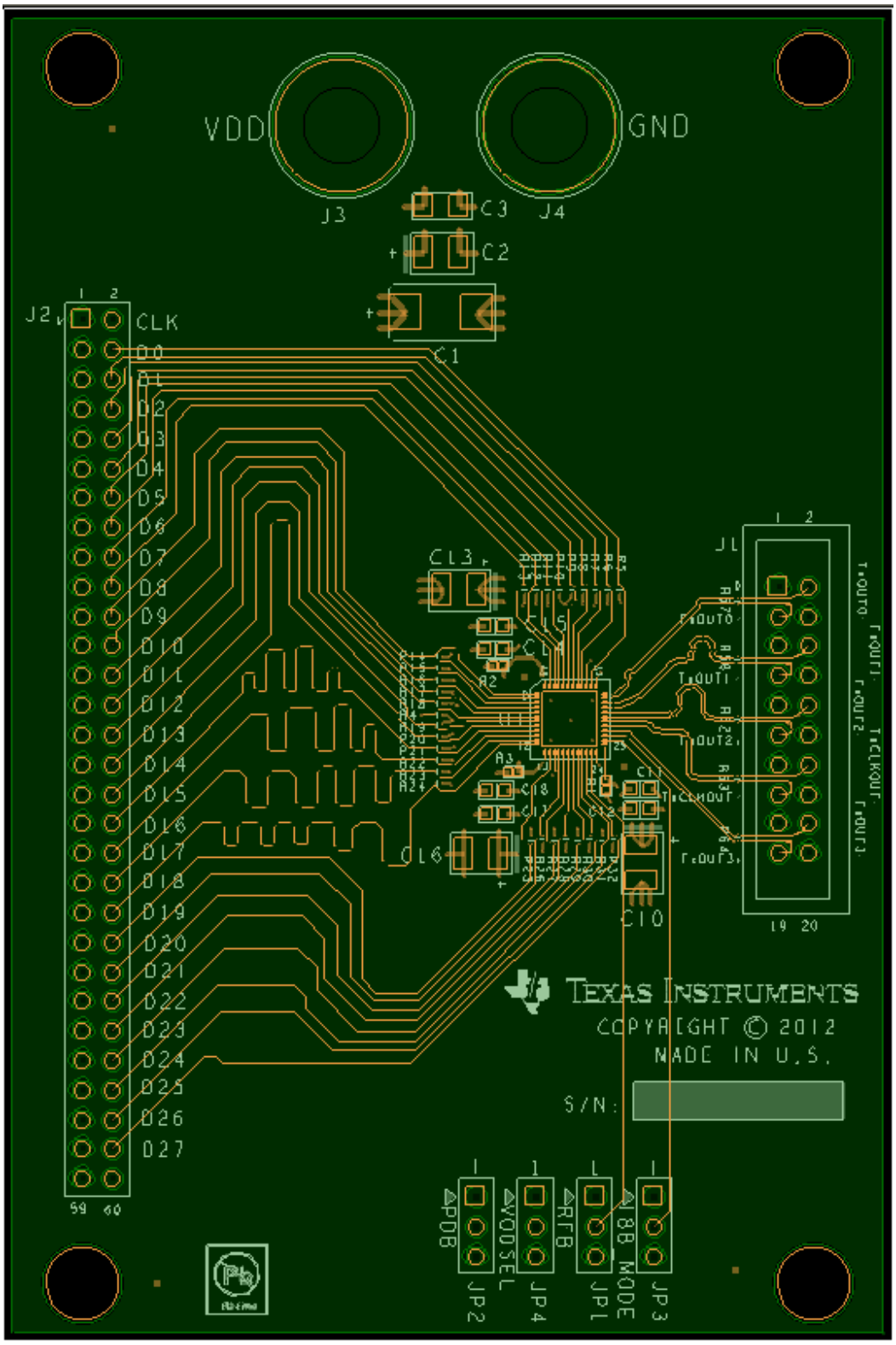


Figure 7: Top Layer Routing

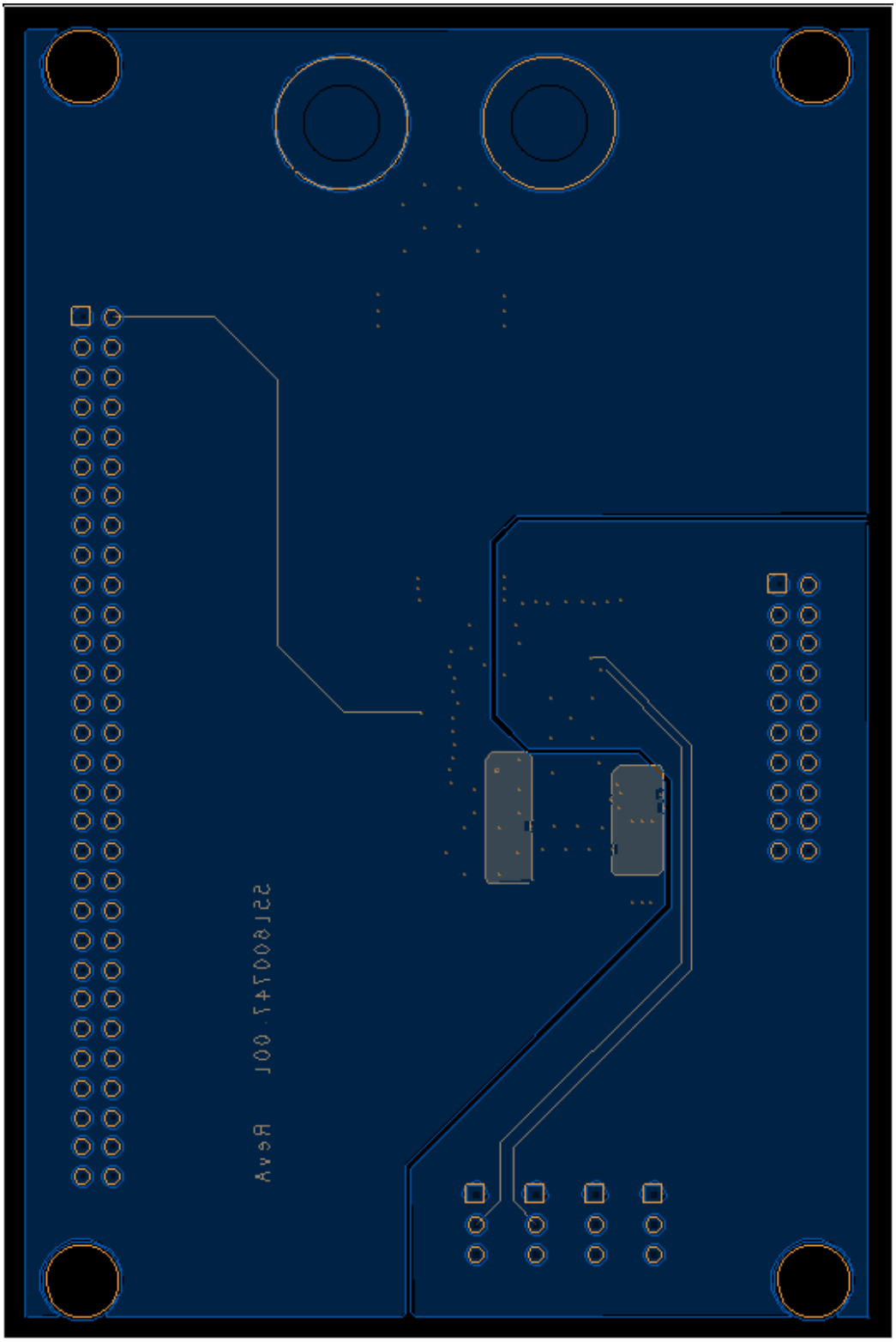


Figure 8: Bottom Layer Routing

4. Schematic

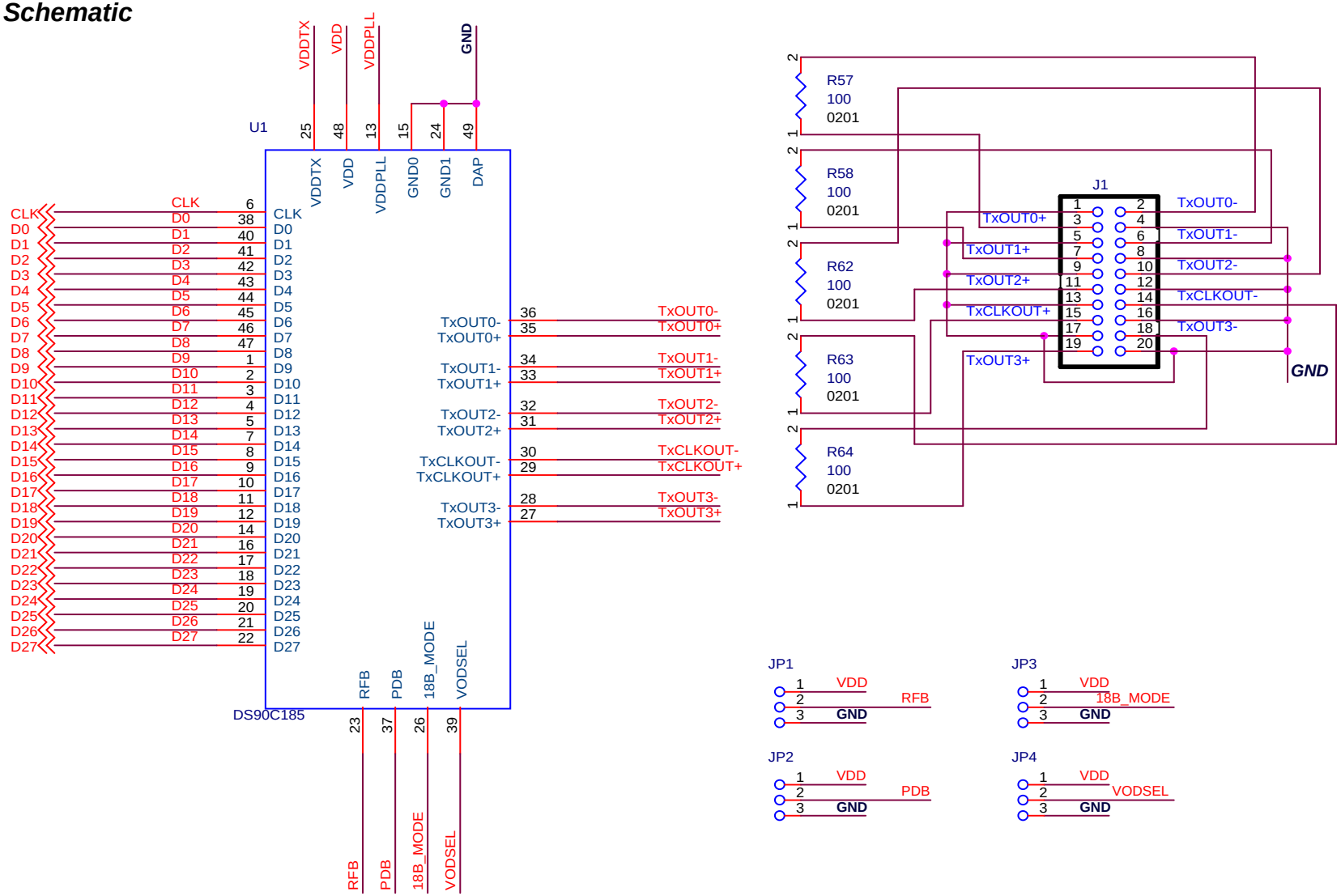


Figure 9: C185EVK01 Schematic Page 1

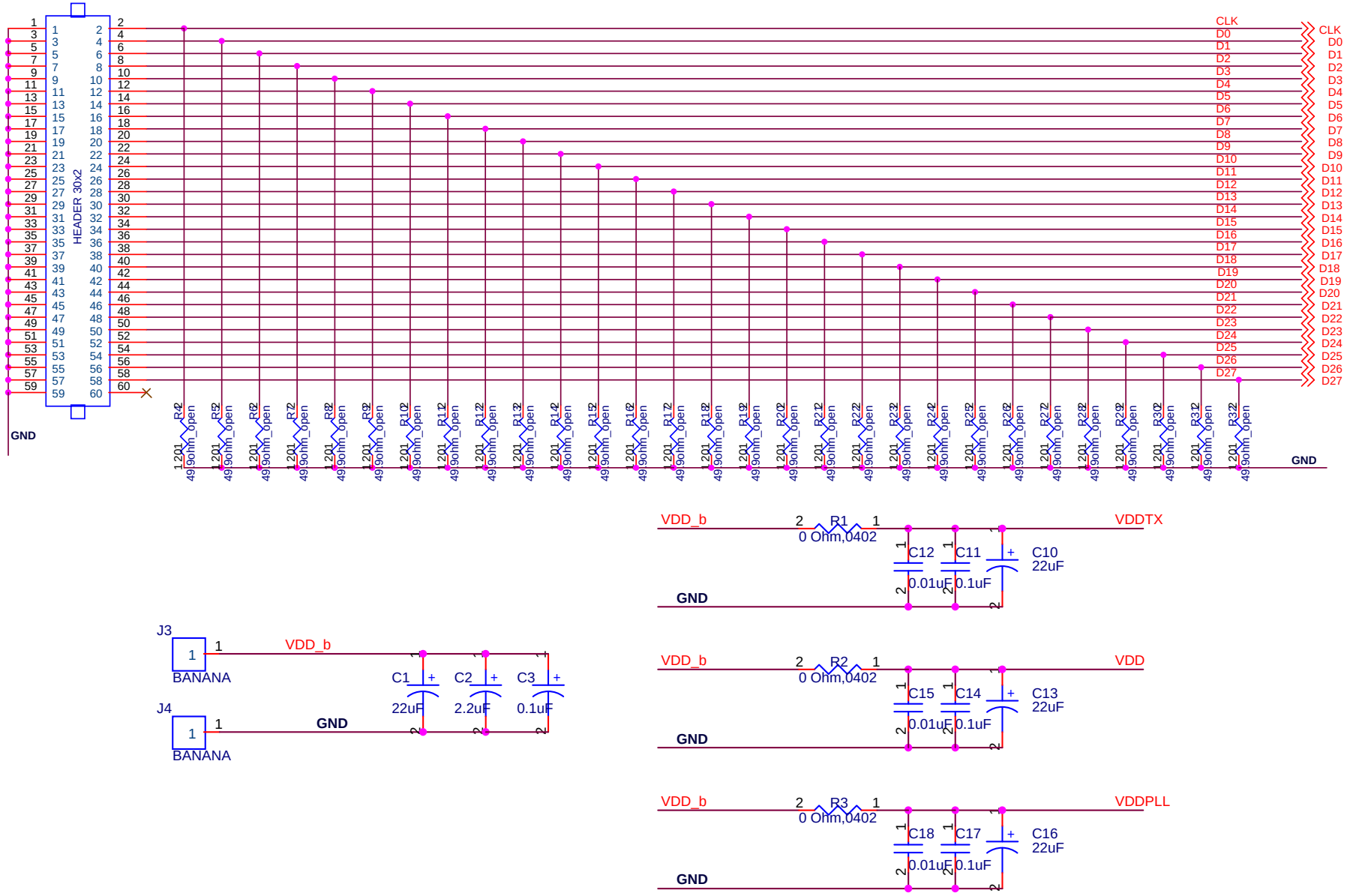


Figure 10: C185EVK01 Schematic Page 1

Table 2: C185EVK01 Bill of Materials

Quantity	Reference Designator	Part	Vendor	Part number
1	C1	22uF	Nichicon	F931E226MNC
1	C2	2.2uF	KEMET	T491B225K020AT
1	C3	0.1uF	KEMET	C1206C104K5RACTU
3	C10,C13,C16	22uF	Kemet	T494B226M016AT
3	C11,C14,C17	0.1uF	Panasonic	ECJ-1VB1E104K
3	C12,C15,C18	0.01uF	KEMET	C0603C103K1RACTU
4	JP1,JP2,JP3,JP4	3-Pin Header	AMP/Tyco	87224-3
1	J1	2X10 Pin Header	3M	N2520-6002RB
1	J2	30x2 Pin Header	AMP/Tyco	3-87215-0
2	J3,J4	BANANA	Johnson	108-0740-001
3	R1,R2,R3	0 Ohm, 0402	Panasonic	ERJ-2GEJ0R00X
29	R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R32	49.9ohm_open	Panasonic	ERJ-1GEF49R9C_open
5	R57,R58,R62,R63,R64	100 ohm	Susumu	RR0306P-101-D
1	U1	DS90C185	TI	DS90C185SQ

FCC Warning

This evaluation board/kit 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 customer 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 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments 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.

EVALUATION BOARD/KIT IMPORTANT NOTICE

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation board/kit 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. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

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 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.

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. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

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.

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.**

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 contact the TI application engineer or visit www.ti.com/esh.

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.

EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of -0.3 V to 48 V and the output voltage range of 0.9 V to 18 V.

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 85° C. The EVM is designed to operate properly with certain components above 60° 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.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265

NOTES

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI. Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices.

Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for 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, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		**Applications**	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
Low Power Wireless	www.ti.com/lpw	Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265