LVCP601 Evaluation Module

The SN75LVCP601 is a dual channel, single lane SATA redriver and signal conditioner supporting data rates up to 6.0Gbps. The device complies with SATA physical link 2m and 3i specifications.

The SN75LVCP601 handles interconnect losses at both its input and output. The input stage of each channel offers selectable equalization settings that can be programmed to match loss in the channel. The differential outputs provide selectable de-emphasis to compensate for the anticipated distortion the SATA signal will experience. Level of equalization and de-emphasis settings depend on the length of interconnect and its characteristics. Both equalization and de-emphasis levels are controlled by the setting of signal control pins EQ1, EQ2 and DE1, DE2.

This evaluation module acts as a reference design that can be easily modified for any intended application. Target applications include notebooks, desktops, docking stations, servers, and work stations. Schematics and layout information are included at the end of this user's guide.

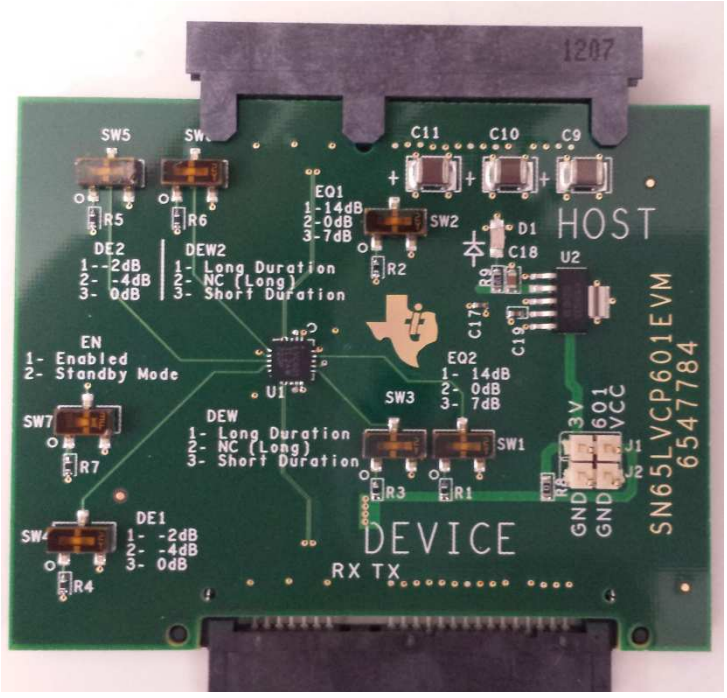


Figure 1. LVCP601 EVM

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1 Introduction

The LVCP601 is a dual channel, single lane SATA redriver and signal conditioner. This guide describes the construction and usage of the EVM for the LVCP601 which is meant to serve as an evaluation tool for the LVCP601, as well as be used as a reference design for the device.

2 LVCP601 Evaluation Module Configuration

Kit Contents:

This EVM kit should contain the following items:

- LVCP601 EVM board
- This user's manual

This board is designed to facilitate easy evaluation of the LVCP601 using internal SATA connectors. Physical switches allow for simple configuration of the equalization, de-emphasis, and operation mode settings of the LVCP601. The EVM board has two internal SATA connectors, one for the host side and one for the device side of the redriver. This module also runs on a 3-V supply voltage that is derived from the standard SATA power connection.

The configuration of the equalization, de-emphasis, de-emphasis width, and standby mode settings are all selected using SW1-SW7. See Table 1 for further details about the configuration of the EVM. Suggested default configuration settings for the EVM can be found in Table 2.

Table 1. Configuration of EVM Using Control Switches

Control Switch	Switch Position and Corresponding Setting Configuration
SW1: EQ2 (Equalizer 2 configuration)	1: 14 dB
	2: 0 dB
	3: 7 dB
SW2: EQ1 (Equalizer 1 configuration)	1: 14 dB
	2: 0 dB
	3: 7 dB
SW3: DEW1 (De-emphasis width 1)	1: Long duration
	2: Long duration
	3: Short duration
SW4: DE1 (De-emphasis 1 configuration)	1: -2dB
	2: -4 dB
	3: 0 dB
SW5: DE2 (De-emphasis 2 configuration)	1: -2 dB
	2: -4 dB
	3: 0 dB
SW6: DEW2 (De-emphasis width 2)	1: Long duration
	2: Long duration
	3: Short duration
SW7: EN (Enable/Standby mode configuration)	1: Enabled
	2: Standby Mode
	3: Standby Mode

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Table 2. Suggested Default Configuration for EVM

Parameter	Default Setting
EQ2	0 dB
EQ1	0 dB
DEW1	Long
DE1	0 dB
DE2	0 dB
DEW2	Long
EN	Enable Mode

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3 PCB Construction

This section contains the schematics, PCB layouts, and the bill of materials.

3.1 EVM Board Schematics

Figure 2 illustrates the SN75LVCP601 EVM schematic.

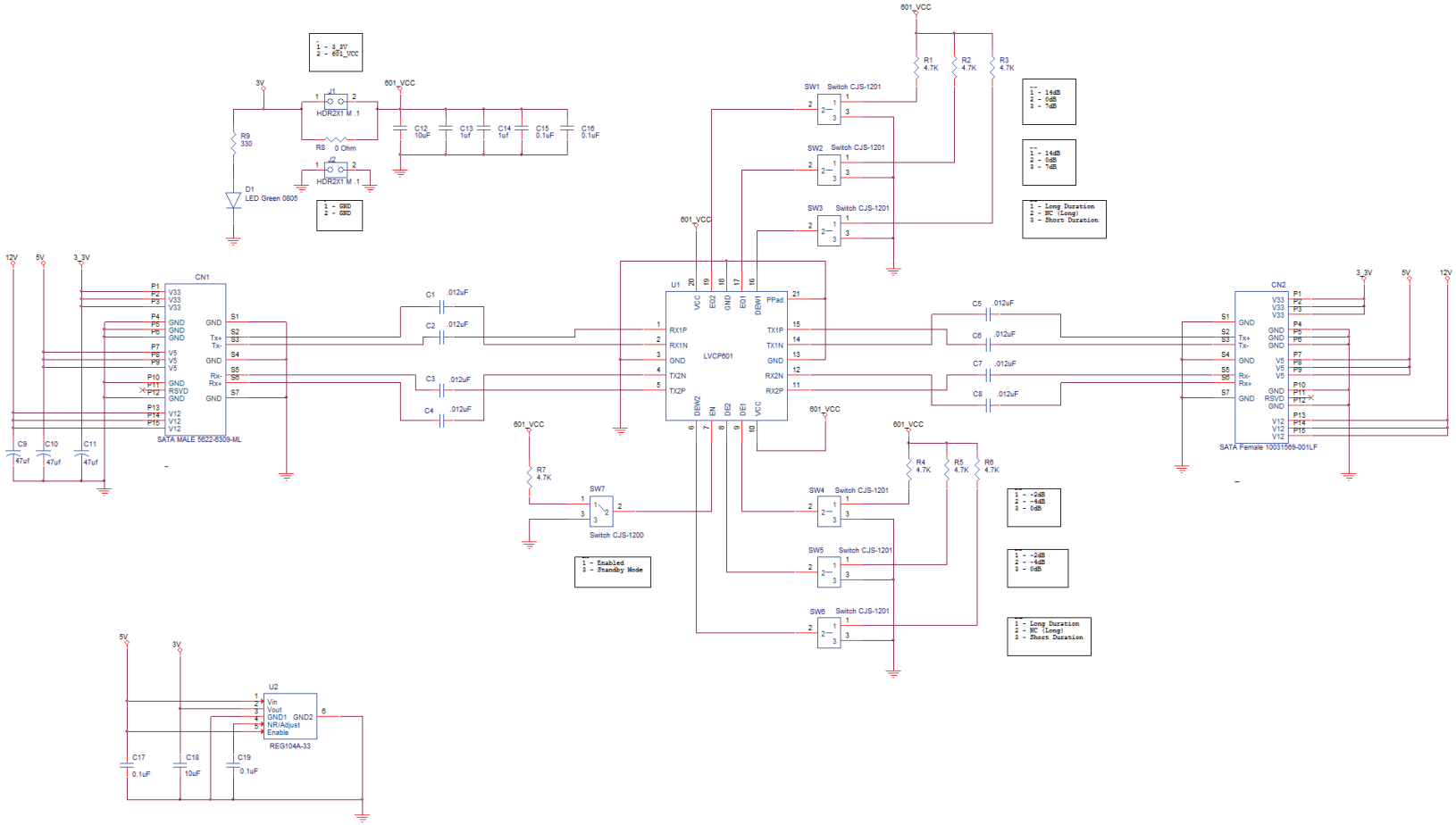


Figure 2. SN75LVCP601 EVM Schematic

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3.2 EVM PCB Layout

Figure 3 through Figure 6 illustrate the PCB layouts.

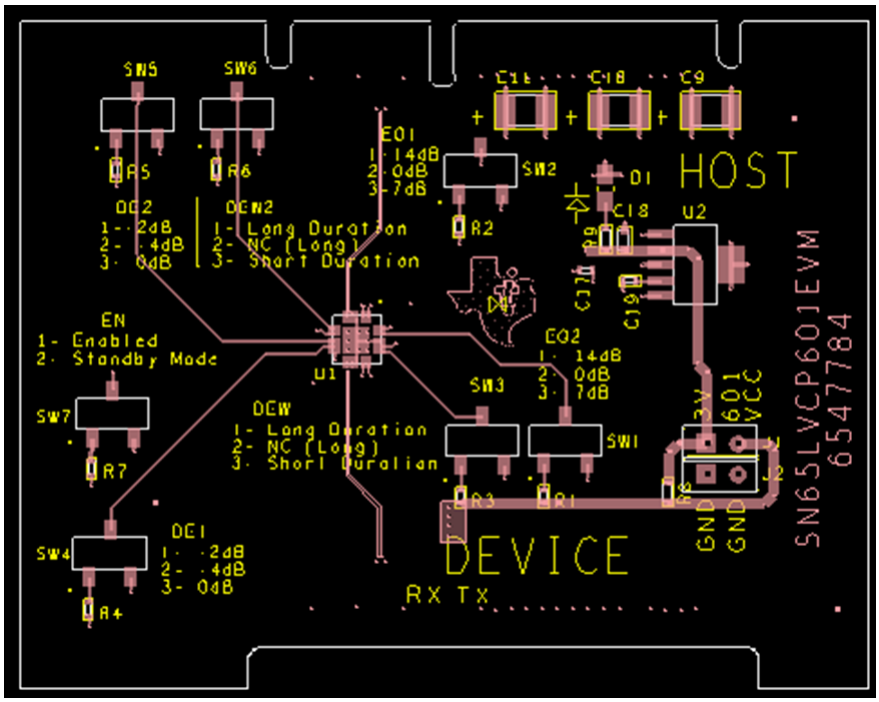


Figure 3. PCB Layout of Top Layer

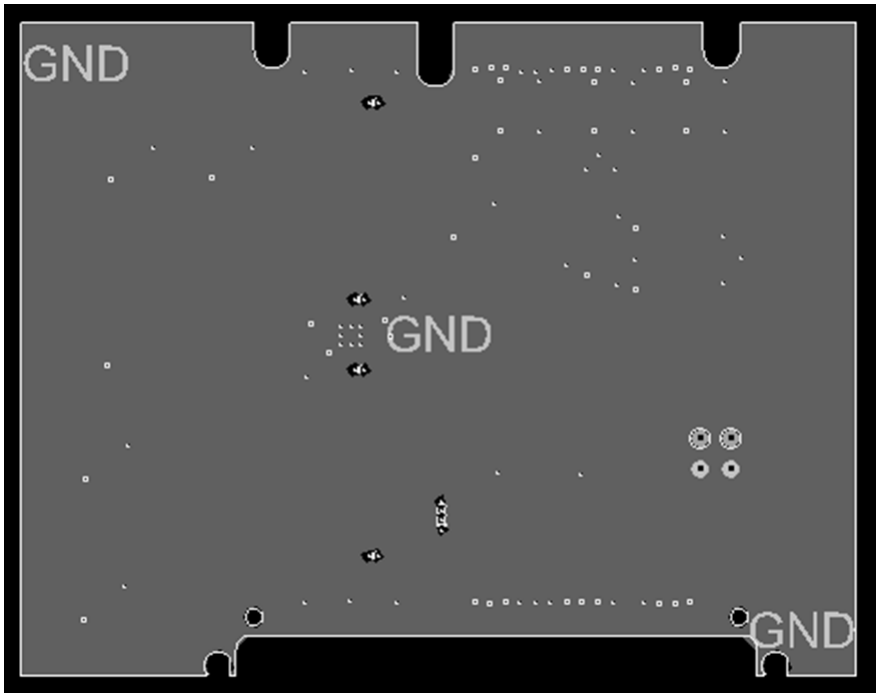


Figure 4. PCB Layout of 2nd Layer

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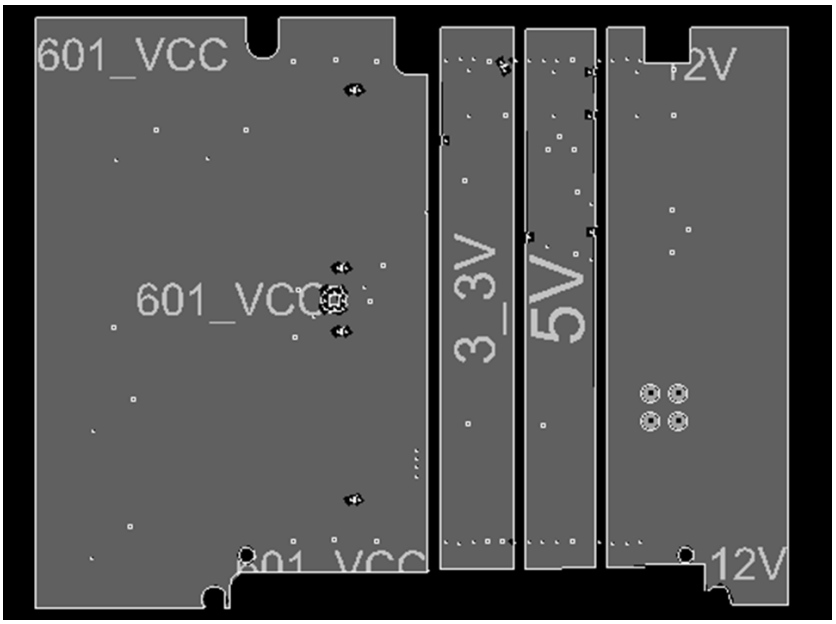


Figure 5. PCB Layout of 3rd Layer

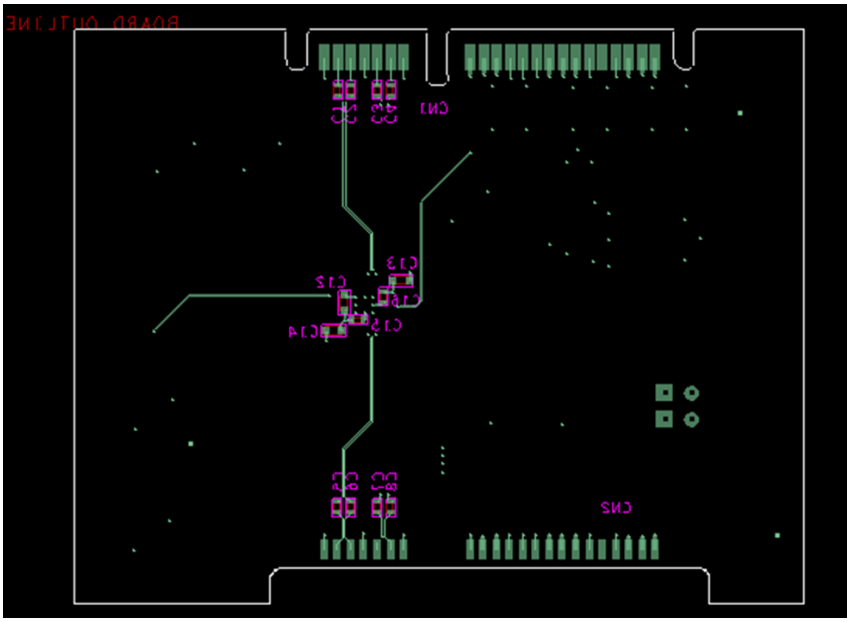


Figure 6. PCB Layout of Bottom Layer

3.2.1 EVM PCB Fabrication

The EVM board is a 4-layer board constructed of FR4-PolyClad 370 material. The board consists of a signal layer on top, a ground layer, a power layer, and another signal layer on the bottom. The impedance of the differential traces is 100 ohms. Other traces have an impedance of 50 ohms.

NOTE: In order to achieve the desired impedance, it is recommended that you consult your board manufacturer for their process and design requirements.

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3.3 LVCP601 EVM Bill of Materials

Table 3 lists the SN75LVCP601 bill of materials.

Table 3. Bill of Materials

Item	Qty	Reference	Value	Digikey P/N	Manufacturer P/N
1	1	CN1	SATA MALE 5622-6309-ML	3M5555-ND	5622-6309-ML
2	1	CN2	SATA Female	609-1029-ND	10031569-001LF
3	8	C1,C2,C3,C4,C5,C6,C7,C8	.012uF	490-3255-1-ND	GRM155R71C123KA01D
4	3	C9,C10,C11	47uf	587-1436-1-ND	EMK325BJ476MM-T
5	2	C12,C18	10uF	445-4112-1-ND	C1608X5R0J106M
6	2	C13,C14	1uf	PCC2422CT-ND	ECJ-1VB1E105K
7	4	C15,C16,C17,C19	0.1uF	445-4984-1-ND	C1005X5R1A104M
8	1	D1	LED Green 0805	67-1553-6-ND	SML-LXT0805GW-TR
9	2	J1,J2	HDR2X1 M .1	A26520-02-ND	4-103321-0-02
10	7	R1,R2,R3,R4,R5,R6,R7	4.7K	P4.7KJCT-ND	ERJ-2GEJ472X
11	1	R8	0 Ohm	P0.0GCT-ND	ERJ-3GEY0R00V
12	1	R9	330 ohm	P330GCT-ND	ERJ-3GEYJ331V
13	6	SW1,SW2,SW3,SW4,SW5, SW6	Switch CJS-1201	563-1023-2-ND	CJS-1201B1
14	1	SW7	Switch CJS-1200	563-1022-1-ND	CJS-1200B1
15	1	U1	SN75LVCP601	296-27627-1-ND	SN75LVCP601RTJT
16	1	U2	REG104A-33	REG104GA-3.3-ND	REG104GA-3.3

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