IDT® 89EBP0604SB SATA 6.25Gbps Evaluation Board Manual

(Evaluation Board: 18-703-000)

March 2011

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Introduction

The 89HP0604SB 6.25Gbps Signal Repeater (also referred to as P0604SB in this manual) is a member of the IDT Signal Integrity Products family. It is a 4-channel repeater that supports 2 bidirectional SATA 6Gbps lane. The main function of a signal repeater is to extend the reach of signals over a board trace or a cable beyond that which can be achieved natively by a SATA host controller or hard disk.

The 89EBP0604SB (EBP0604SB) evaluation board provides an evaluation platform for the P0604SB signal repeater. The evaluation board provided by IDT can be configured to test the functionality of the P0604SB device in a wide variety of system topologies.

Board Features

Hardware

- P0604SB Signal Repeater for extending SATA 6Gbps reach
  - Single P0604SB device enabling 2 bidirectional SATA 6Gbps lane on a single board
  - SATA connectors on each side of the board allow cables connecting to Host and Target devices.
- Numerous user-selectable configurations set using onboard jumpers and DIP-switches
  - Channel selection
  - Device power down
  - Receiver equalization
  - Transmitter swing

Revision History

March 18, 2011: Initial publication of evaluation board manual.

Notes

Installation of the EBP0604SB SATA 6G Evaluation Board

Notes

EBP0604SB Installation

This chapter discusses the steps required to configure and install the EBP0604SB evaluation board. All available DIP switches and jumper configurations are explained in detail.

The primary installation steps are:

1. Configure jumper/switch options suitable for the evaluation or application requirements.
2. Connect the SATA 6G cable between the Host and EBP0604SB. Connect the SATA 6G cable between the EBP0604SB and the SATA device, such as an external SATA storage drive.
3. Apply power via SATA power connector.

The EBP0604SB board is typically shipped with all jumpers and switches configured to their default settings. In most cases, the board does not require further modification or setup.

For technical support, please visit the IDT website and fill out the Technical Support Request form at http://www.idt.com/?app=TechSupport&prodFamily=signal%20integrity%20products.

Hardware Description

The IDT 89HP0604SB is a 6.25Gbps Repeater IC that reconditions high-speed serial data streams. The 89HP0604SB contains four half-duplex data lanes, where each half-duplex lane consists of a differential equalizer, as well as a transmit driver that includes de-emphasis.

The EBP0604SB consists of single P0604SB device.

Basic requirements for the board to run are:

- SATA Host Controller.
- SATA Target Device (HDD).

External Power Source

External power is supplied to the EBP0604SB board through a 15-pin SATA power connector (J7). The external power supply provides +3.3V to the EBP0604SB as described in Table 2.1. The +12V and +5V are unused. Please do not use adapters that can convert a 4-pin Molex connector to a SATA power connector because the 4-pin Molex connectors do not provide +3.3V power, these adapters provide only +5V and +12V power and leave the +3.3V lines unconnected.

Pin	Signal
1	3.3V
2	3.3V
3	3.3V
4	GND
5	GND
6	GND
7	5V
8	5V

Table 2.1 External Power Connector — J7 (Part 1 of 2)

Notes

Pin	Signal
9	5V
10	GND
11	SPIN-UP
12	GND
13	12V
14	12V
15	12V

Table 2.1 External Power Connector — J7 (Part 2 of 2)

1.2V Voltage Regulator

A 3.3V to 1.2V voltage regulator (VR2) provides the 1.2V supply voltage (VDD) to the P0604SB.

Boot Configuration Vector

A boot configuration vector consisting of the signals listed in Table 2.2 is sampled by the P0604SB during power-on. The boot configuration vector defines the essential parameters for repeater operation and is set using DIP switches S2 as defined in Table 2.2.

Signal	Description
S2[0]: CHSEL	Channel Transfer Mode. CHSEL — Setting VSS — Multi-cast mode Open — Direct-connect mode (default) VDD — Cross-connect mode
S2[1]: A[0]RXEQ S2[2]: A[1]RXEQ	Receiver Equalization at F=3GHz (6Gbps). Programming of channel A0 via pin is shown below. To program channel A1, use pin for that channel. A0RXEQ — Setting VSS — 2dB (3GHz) Open — 6dB (3GHz) (Default) VDD — 14dB (3GHz)
S2[3]: B[0]RXEQ S2[4]: B[1]RXEQ	Receiver Equalization at F=3GHz (6Gbps). Programming of channel B0 via pin is shown below. To program channel B1, use pin for that channel. B0RXEQ — Setting VSS — 2dB (3GHz) Open — 6dB (3GHz) (Default) VDD — 14dB (3GHz)

Table 2.2 Boot Configuration Vector Signals (Part 1 of 2)

Notes

Signal	Description
S2[5]: A[0]TXSW S2[6]: A[1]TXSW	Transmitter Voltage Swing (pk-pk). Programming of channel A0 via pin is shown below. To program channel A1, use pin for that channel. A0TXSW — Swing — De-Emphasis VSS — 0.5Vdiff-pkpk — 0dB Open — 0.8Vdiff-pkpk (Default) — -3.5dB VDD — 0.95Vdiff-pkpk — -6.5dB
S2[7]: B[0]TXSW S2[8]: B[1]TXSW	Transmitter Voltage Swing (pk-pk). Programming of channel B0 via pin is shown below. To program channel B1, use pin for that channel. B0TXSW — Swing — De-Emphasis VSS — 0.5Vdiff-pkpk — 0dB Open — 0.8Vdiff-pkpk (Default) — -3.5dB VDD — 0.95Vdiff-pkpk — -6.5dB
S2[9]: PDB	Power-down Enable. PDB — Setting VSS — Powerdown IC. RX terminations are in Hi-Z, TX is disabled VDD — Normal operation (internal 11K ohm minimum pull-up applied)

Table 2.2 Boot Configuration Vector Signals (Part 2 of 2)

For the pin list in Table 2.2, two 3-level input pins will have four bit outputs. The 3-level input can be mapped to hexadecimal notation as shown in Table 2.3.

Example [1:0] Input Voltage (VSS, VMI,VDD)	Example[3:0] Hexadecimal Notation
VSS, VSS	4'h0 (0000)
VSS, VMI	4'h1 (0001)
VSS, VDD	4'h3 (0011)
VMI, VSS	4'h4 (0100)
VMI, VMI	4'h5 (0101)
VMI, VDD	4'h7 (0111)
VDD, VSS	4'hC (1100)
VDD, VMI	4'hD (1101)
VDD, VDD	4'hF (1111)

Table 2.3 Two Bit 3-Level Input Hexadecimal Notation

Notes

LEDs

There are LED indicators on the EBP0604SB which convey status feedback. A description of each is provided in Table 2.4.

Location	Color	Definition
DS3	Green	3.3V Power Indicator
DS4	Green	1.2V Power Indicator

Table 2.4 LED Indicators

SATA Connectors

The P0604SB repeater has no special orientation requirements with respect to the host controller or disk drive. SATA connectors J18, J19, J20 and J21 can be attached via a cable to either the host or hard disk drive. The channel/trace length between the P0604SB and J19 is 18 inches which is intended to model a typical PC environment. It is important, however, to properly set the receiver equalization and transmitter settings based on the cable/channel length being used.

EBP0604SB Board Figures

The top and bottom views of the board are shown in Figures 2.1 and 2.2 respectively.

Notes

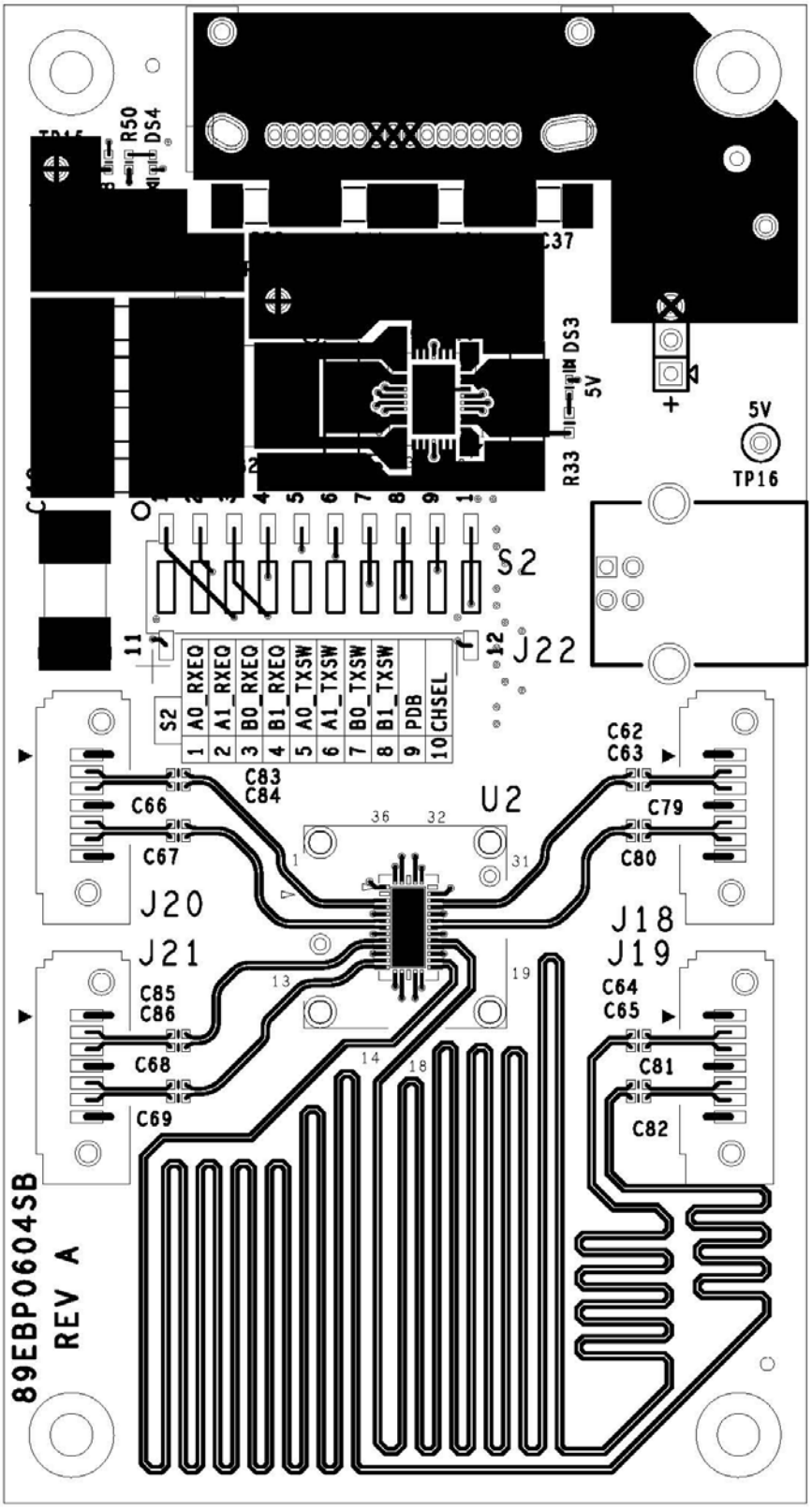

Figure 2.1 EBP0604SB Board Topside View

Notes

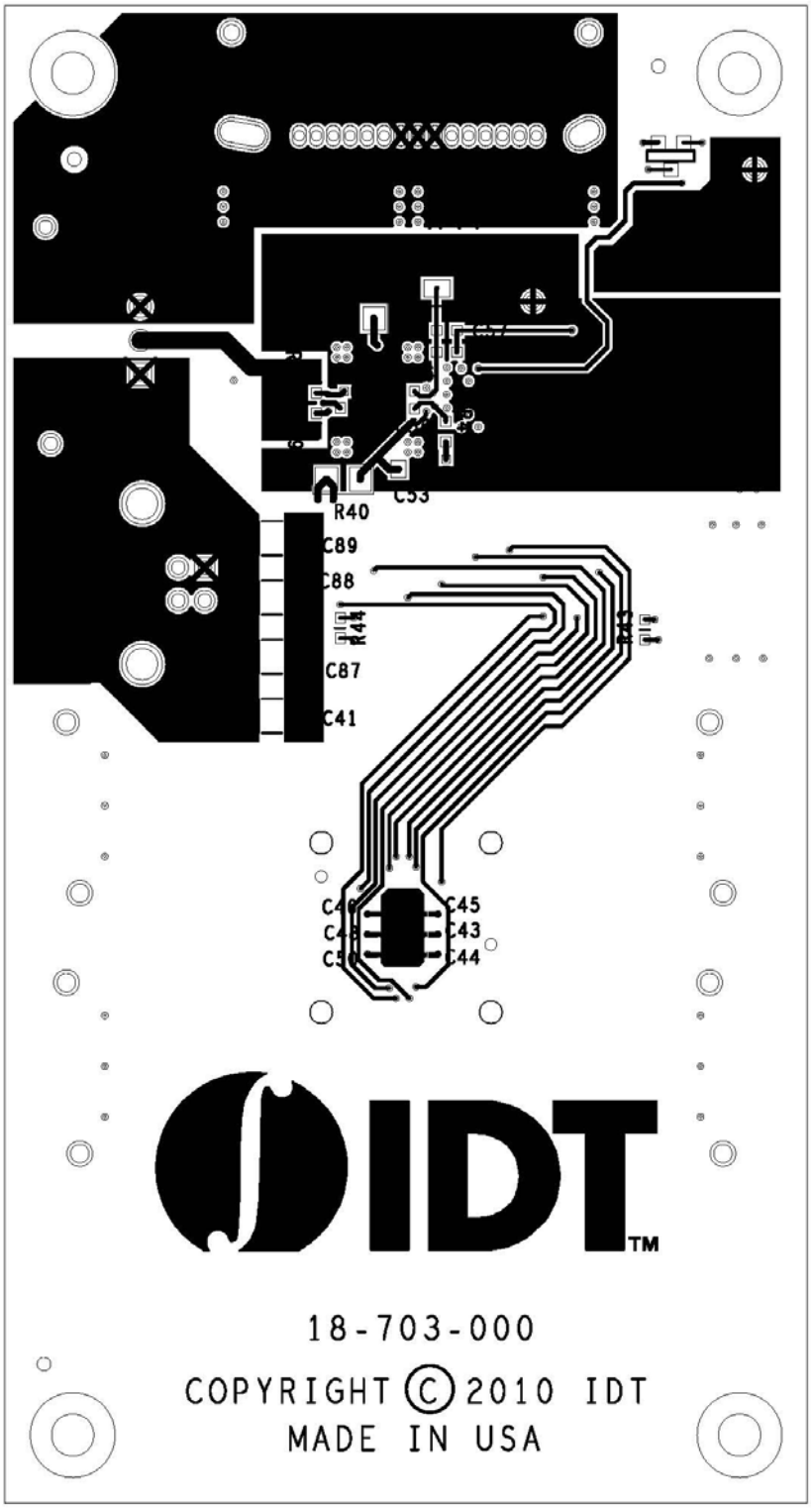

Figure 2.2 EBP0604SB Board Bottom View

Schematics

Notes

Schematics

REVISIONS				
DCN	REV	DESCRIPTION	DATE	CHANGE BY
	A	INITIAL RELEASE	2010-08-05	K. LEUNG

IDT 89HP0604S(B) 36-QFN SATA EVALUATION BOARD

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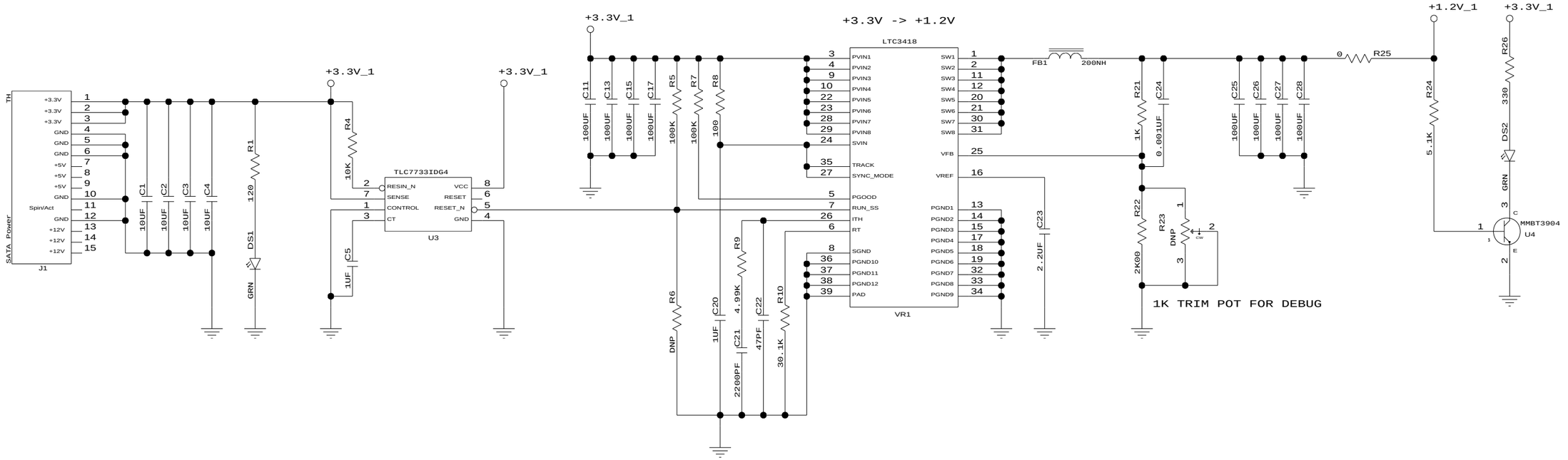
TITLE: 89EBP0604S(B) Eval Board			
SIZE: B	DRAWING NO.: P0604S-SATA-EB-001	FAB P/N: 18-703-000	REV.: A
AUTHOR: K. Leung		CHECKED BY: D. Huang	
Mon Dec 06 16:35:06 2010		SHEET 1 OF 6	



TITLE 89EBP0604S(B) Eval Board

89HP0604S, POWER

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AUTHOR K. Leung | CHECKED BY D. Huang

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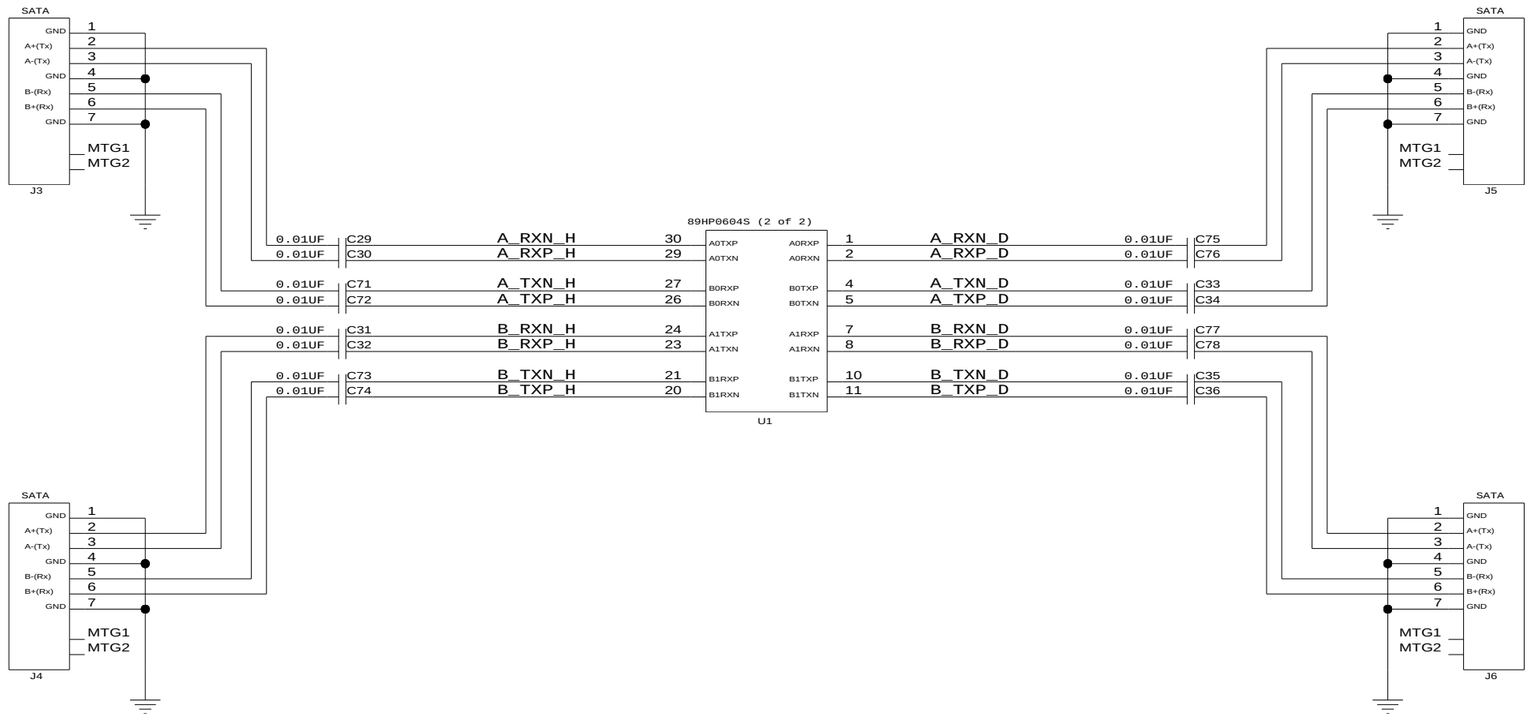

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89HP0604S, SATA CONNECTORS

SIZE	DRAWING NO.	FAB P/N	REV.
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AUTHOR	CHECKED BY
K. Leung	D. Huang

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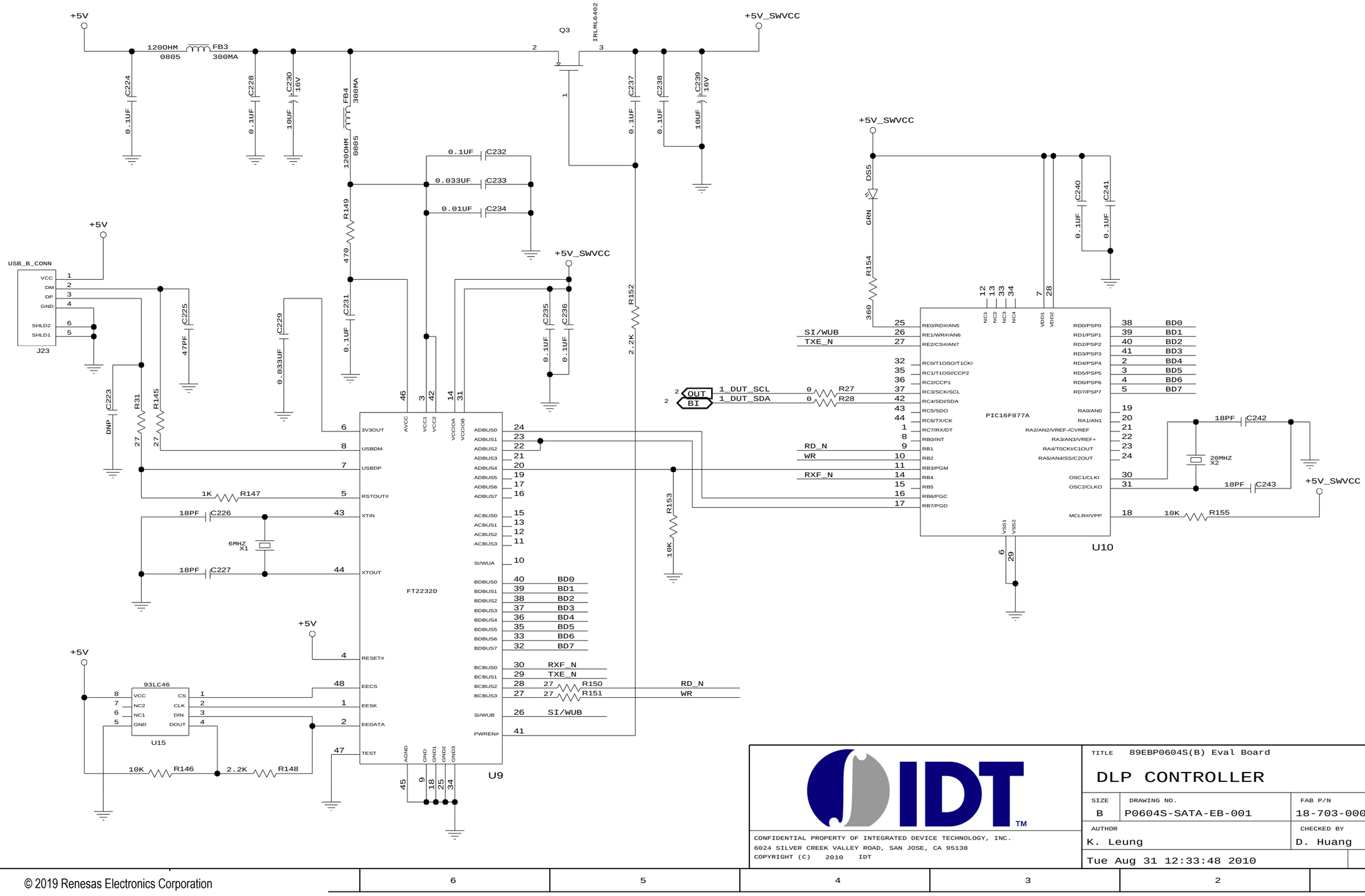

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TITLE 89EBP0604S(B) Eval Board

DLP CONTROLLER

SIZE	DRAWING NO.	FAB P/N	REV.
B	P0604S-SATA-EB-001	18-703-000	A

AUTHOR	CHECKED BY
K. Leung	D. Huang

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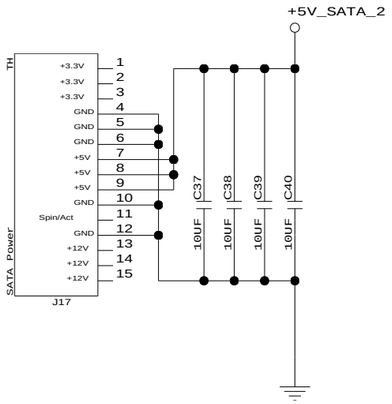
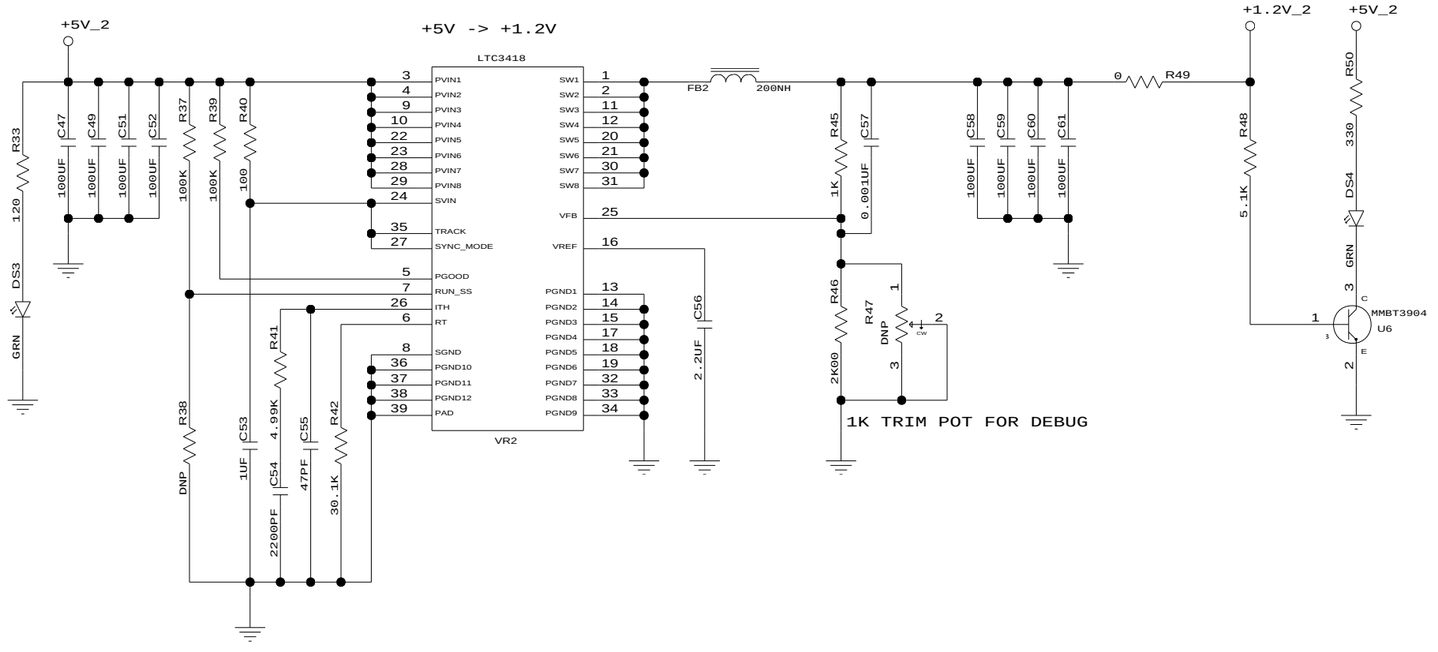
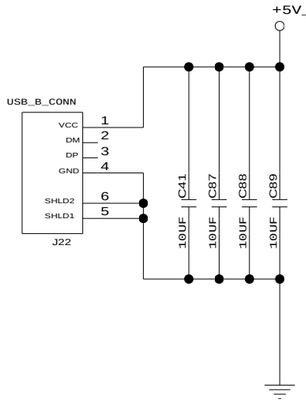
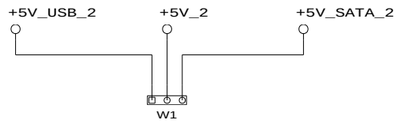
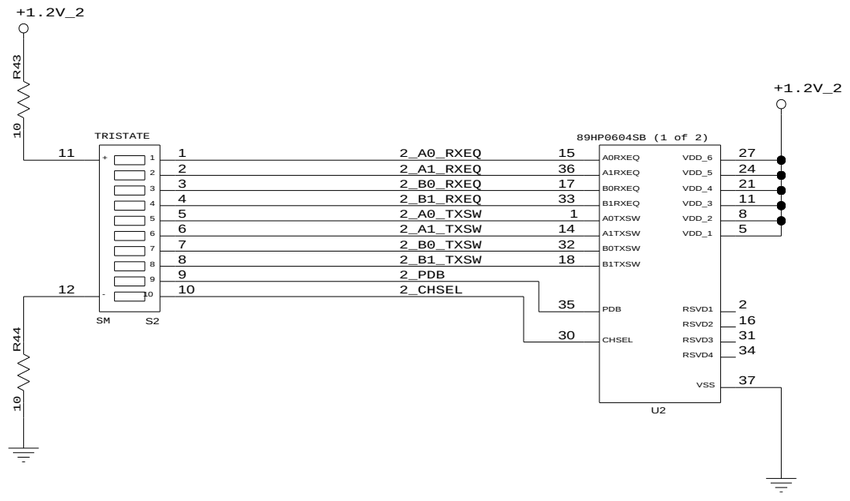


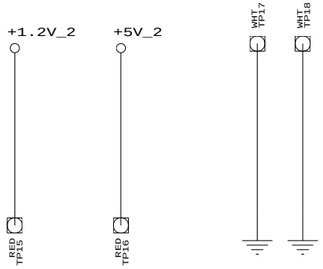


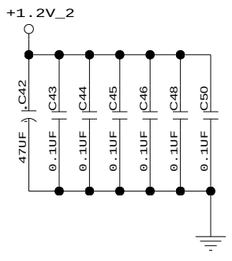




1-2: USB POWERED (J22)
2-3: SATA POWERED (J17)







TITLE 89EBP0604S(B) Eval Board

89HP0604SB, POWER

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AUTHOR	CHECKED BY
K. Leung	D. Huang

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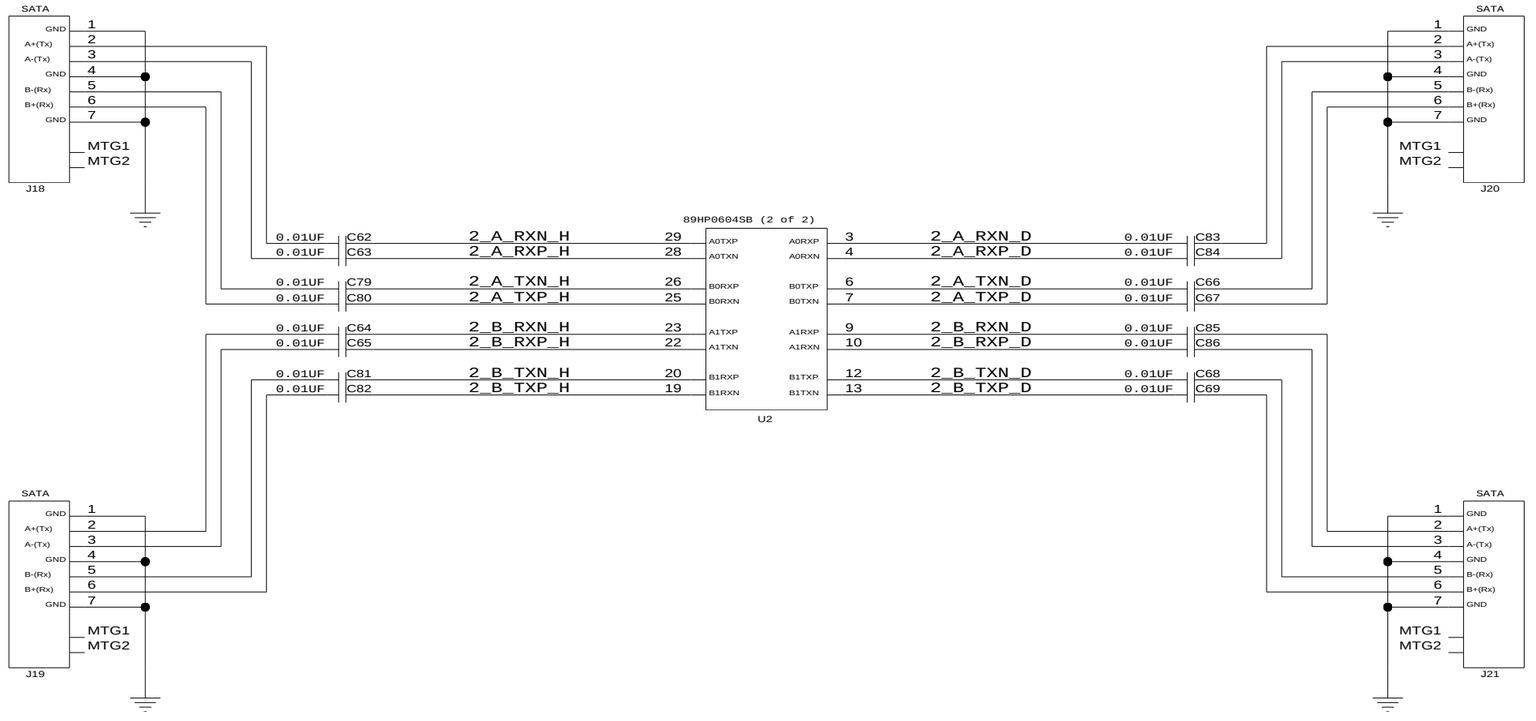

TITLE 89EBP0604S(B) Eval Board

89HP0604SB,SATA CONNECTORS

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B	P0604S-SATA-EB-001	18-703-000	A

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