



## **EB-GS2993**

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### **Evaluation Board User Guide**

Version	ECR	Date	Changes and / or Modifications
0	154023	April 2010	New document.

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## General Description

The GS2993 evaluation package is designed to accelerate the evaluation process of the GS2993 Adaptive Cable Equalizer.

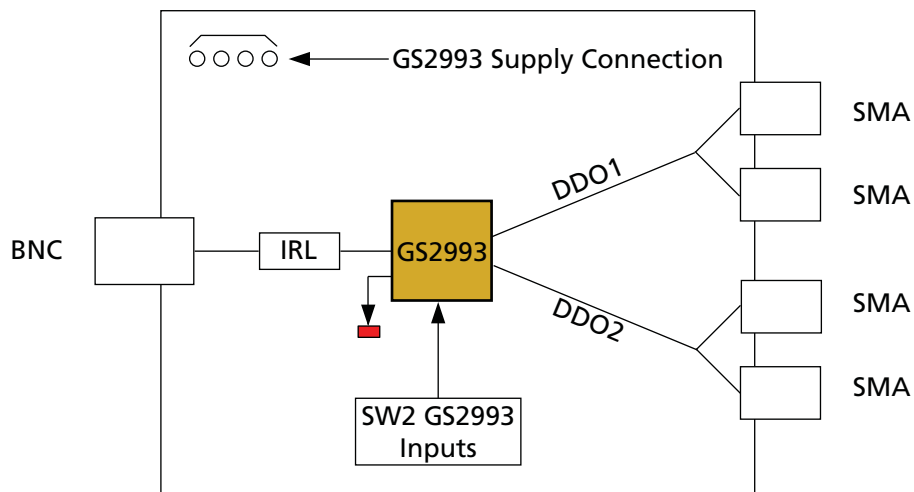
It is strongly recommended to read the GS2993 Data Sheet (Doc ID: 53966) before using this evaluation kit.

## Evaluation Kit Contents

- Gennum EB-GS2993 Evaluation Board
- CD containing GS2993 Collateral

## Overview

The purpose of the EB-GS2993 Evaluation Board is to evaluate the GS2993 Multi-rate Cable Equalizer. This device is designed to support SMPTE 424M, SMPTE 292M and SMPTE 259M serial digital video signals standards, and is optimized for performance at 270Mb/s, 1.485Gb/s and 2.97Gb/s data rates.



EB-GS2993 Functional Block Diagram

# 1. Evaluation Board User Guide

Figure 1-1 shows the inputs, outputs and power connections for the EB-GS2993.

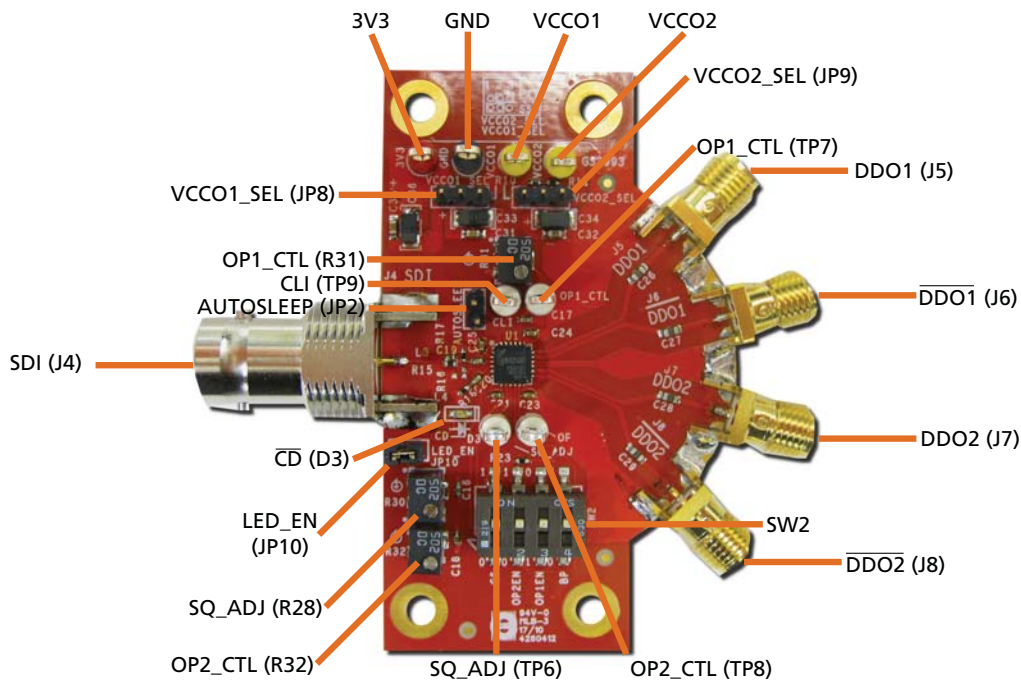


Figure 1-1: GS2993 Evaluation Board (EB-GS2993)

## 1.1 SDI Inputs and Outputs

The GS2993 is a high-speed BiCMOS integrated circuit designed to equalize and restore signals received over 75Ω co-axial cables. The EB-GS2993 is the evaluation board for the GS2993. The EB-GS2993 features one 75Ω single-ended input through a BNC connector (SDI/J4), and two pairs of 100Ω differential outputs (DDO1/J5,  $\overline{\text{DDO1}}$ /J6 and DDO2/J7,  $\overline{\text{DDO2}}$ /J8) through SMA connectors.

## 1.2 Power

The EB-GS2993 features four power posts (3V3, GND, VCCO1, VCCO2). By default, the GS2993 can be powered with a single power supply connected to 3V3. Alternatively, the GS2993 outputs can be powered using a second and third power supply connected to VCCO1 and VCCO2. The power configuration jumpers VCCO1\_SEL and VCCO2\_SEL must be configured accordingly.

When the outputs are powered separately, the power supply can be set between 1.2V and 3.3V.

## 1.3 Switch Settings

A four-point dip switch (SW2) provides the GS2993's input selection. The switch positions are marked on the silkscreen, and are described in [Table 1-1](#) below:



**Table 1-1: SW1 Settings**

Switch Label	Switch OFF	Description	Switch ON	Description
GS	0	Gain Select off, no change in gain (default)	1	Gain Select on, 6dB gain
OP2EN	0	OUTPUT2 disabled	1	OUTPUT2 enabled (default)
OP1EN	1	OUTPUT1 enabled (default)	0	OUTPUT1 disabled
BP	0	Bypass off (default)	1	Bypass on



## 1.4 Jumper Settings

The jumpers on the EB-GS2993 board are described in the following tables:



**Table 1-2: AUTOSLEEP (JP7) Jumper Settings**

Label	Connection	Description
Connected (default)		Enables the AUTOSLEEP function
Unconnected		Disables the AUTOSLEEP function

**Table 1-3: VCCO1\_SEL (JP8), VCCO2\_SEL (JP9) Jumper Settings**

Label	Connection	Description
SS (default)		Shared supply mode
EXT		Output uses a separate external supply

**Table 1-4: LED\_EN (JP10) Jumper Settings**

Label	Connection	Description
Connected (default)		LED is enabled
Unconnected		LED is disabled

## 1.5 Potentiometer Settings

Adjusting the potentiometers clockwise will decrease the voltage level at the SQ\_ADJ and OP\_CTL pins. Adjusting the potentiometers counter-clockwise will increase the voltage level at the SQ\_ADJ and OP\_CTL pins.

### 1.5.1 OP1\_CTL, OP2\_CTL Potentiometer Settings

The output control potentiometer settings are described in [Table 1-5](#) below:

**Table 1-5: OP1\_CTL, OP2\_CTL Input Settings**

Level	Swing	De-emphasis	Mute	Voltage
0	800mV	Off	N	0
1	800mV	2dB	N	1 x (VCC/8)
2	800mV	4dB	N	2 x (VCC/8)
3	800mV	6dB	N	3 x (VCC/8)
4	400mV	Off	N	4 x (VCC/8)
5	400mV	2dB	N	5 x (VCC/8)
6	400mV	4dB	N	6 x (VCC/8)
7	400mV	6dB	N	7 x (VCC/8)
8	400mV	N/A	Y	VCC

### 1.5.2 Squelch Adjust (SQ\_ADJ) Potentiometer Settings

There is one multi-turn potentiometer on the EB-GS2993 assigned for squelch adjust, which adjusts the voltage seen at the SQ\_ADJ pin. This input adjusts the threshold of the CD pin. When the SQ\_ADJ input is 0V, all cable lengths will be equalized. When the SQ\_ADJ input is 3.3V, there will be no equalization regardless of the cable length. Please refer to the GS2993 Data Sheet for more details on carrier detect and squelch adjust.

## 1.6 LED Indicator

D3 is the Carrier Detect LED for the GS2993. D3 is on when no carrier is detected and stays off otherwise. There is one LED\_EN jumper which when disconnected, it disables the LED. This is useful when measuring system power dissipation.

## 2. Schematic

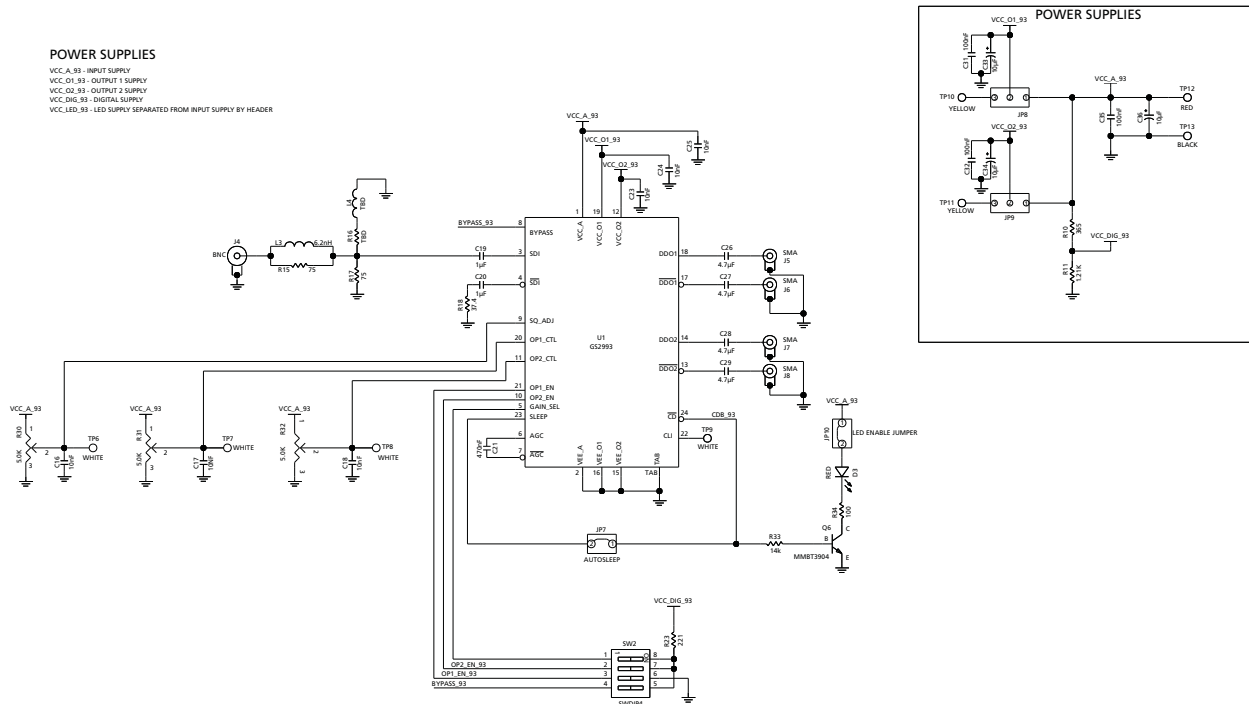


Figure 2-1: GS2993 Schematic

### 3. Board Layout

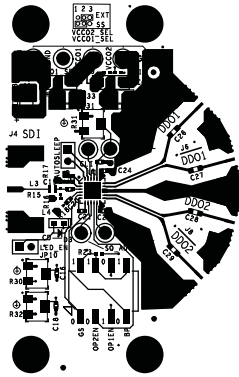


Figure 3-1: Layer 1 (Top Layer) and Top Silkscreen

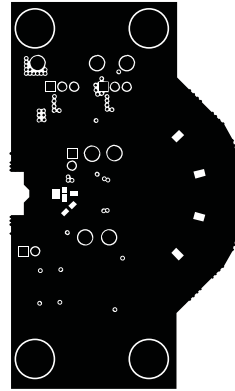


Figure 3-2: Layer 2 (Ground)

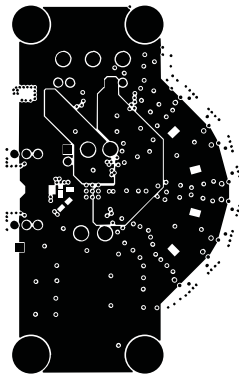


Figure 3-3: Layer 3 (Power)

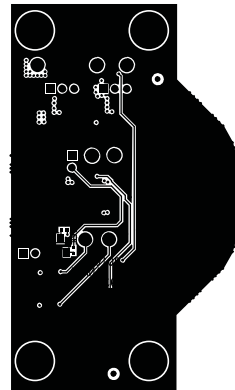


Figure 3-4: Layer 4 (Bottom)



## 4. Bill of Materials

Table 4-1: Bill of Materials

Quantity	Reference Designator	Part
6	C16, C17, C18, C23, C24, C25	Capacitor, ceramic; 10,000pF, 16V, 10%, X7R 0402
2	C19, C20	Capacitor, ceramic; 1.0 $\mu$ F, 10V, X5R 0402
1	C21	Capacitor, ceramic; 0.47 $\mu$ F, 10V, X5R 0402
4	C26, C27, C28, C29	Capacitor, ceramic; 4.7 $\mu$ F, 10V, 10%, X5R 0603
3	C31, C32, C35	Capacitor, ceramic; 0.1 $\mu$ F, 16V, 10%, X7R 0603
3	C33, C34, C36	Capacitor, tantalum; 10 $\mu$ F, 10V, 10%, 3216/1206
1	D3	LED, red; SMD type 0603
1	J4	Connector; BNC, edge-mount, PCB (Cambridge C-SX-077)
4	J5, J6, J7, J8	Connector; SMA, edge-mount, short signal pin (Johnson 142-0791-881)
2	JP8, JP9	Connector; header 2mm single straight 36-position (3 positions used)
2	JP7, JP10	Connector; header 2mm single straight 36-position (2 positions used)
1	L3	Inductor; 6.2nH, 300mA, 0402
1	Q6	Transistor; GP NPN AMP SOT23-3
1	R10	Resistor; 365 $\Omega$ , 1/16W, 1%, 0402 SMD
2	R15, R17	Resistor; 75.0 $\Omega$ , 1/16W, 1%, 0402 SMD
1	R11	Resistor; 1.21k $\Omega$ , 1/16W, 1%, 0402 SMD
1	R23	Resistor; 221 $\Omega$ , 1/16W, 1%, 0402 SMD
1	R18	Resistor; 37.4 $\Omega$ , 1/16W, 1%, 0402 SMD
1	R33	Resistor; 14.0k $\Omega$ , 1/16W, 1%, 0402 SMD
1	R34	Resistor; 100 $\Omega$ , 1/16W, 1%, 0402 SMD
3	R30, R31, R32	Potentiometer; 5.0k $\Omega$ 1/4W 10% 4mm cermet top SMD 5-turn
1	SW2	Switch; tape seal 4-position SMD
4	TP6, TP7, TP8, TP9	Test Point, PC multi-purpose (white)
2	TP10, TP11	Test Point, PC multi-purpose (yellow)
1	TP12	Test Point, PC multi-purpose (red)
1	TP13	Test Point, PC multi-purpose (black)
1	U1	Gennum GS2993 3Gb/s Equalizer, QFN24-4X4X1MM-0P5MM

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**DOCUMENT IDENTIFICATION  
EVALUATION BOARD USER GUIDE**

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