Features

- fully assembled and tested
- on-board mode selection switch
- on-board PLL Lock and Loss of Signal LED indicators
- SMA connectors for all high-speed data inputs and outputs

General Description

The XBN2003 Rev 5 evaluation board is designed to simplify and speed-up the evaluation process of Gennum's GN2003 and GN2003S devices.

This document describes the application of the XBN2003 Rev 5 Evaluation Board for the GN2003S SONET XFP Rx Signal Conditioner.

The block diagram of the XBN2003 Rev 5 evaluation board is shown on page 2.

An input signal is applied to the board either through the Limiting Amplifier Input (LAIn) or through the Loop Back Serial Data Input (LBSDI) SMA connectors using 50Ω coaxial cables.

The on-board chip accepts signal only from one of the inputs at a time and ignores the other input.

The on-board GN2003S chip performs conditioning of the received data.

The conditioned data is available on the Serial Data Output (SDO) SMA connectors.

The GN2003S device has an optional output eye adjustment capability to compensate for the losses introduced by the XFP connector and up to 4 inches of a PCB trace.

Two LEDs indicate the status of the GN2003S device.

- The PLL Lock green LED (D1), when lit, indicates that the PLL is locked.
- The LOS red LED (D2), when lit, indicates that the limiting amplifier input signal level is below application set threshold level.

The schematic diagram of the XBN2003 Rev 5 evaluation board is shown in Figure 2-1 on page 4.

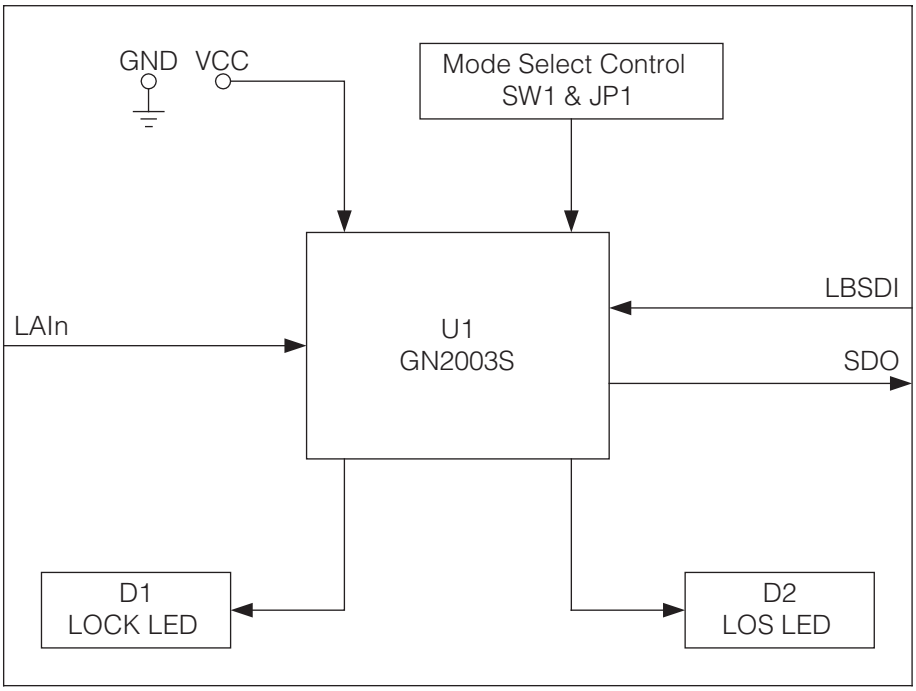
The PCB layout information is shown in Figure 2-2 on page 5, Figure 2-3 on page 6, and Figure 2-4 on page 7.

The XBN2003 Rev 5 printed circuit board is a four-layer, .062" board.

Top layer uses RT Duriod 6002, low dielectric loss material.

All other layers are standard FR-4 material.

All high-speed data traces between SMA connectors and the GN2003S device are 100Ω differential microstrip lines on the top layer.



XBN2003 Rev 5 Evaluation Board Block Diagram

Contents

1. Quick Start Sequence

1. Configure the evaluation board in accordance to the desired mode (see Figure 3-1 on page 9, Figure 3-2 on page 10, and Figure 3-3 on page 11).
2. Connect the power supply ground to the on-board "GND" connector.
3. Connect a +3.3V power supply to the on-board "VCC" connector (current limit on the power supply should be set to 100mA).
4. Using 50Ω coaxial cables, apply an input with amplitude between 10mVppd and 1200mVppd to the LAIN/LAIP SMA connectors.
5. To evaluate Loop Back path, apply an input with amplitude of 100mVppd to the LBSDI SMA connectors using 50Ω coaxial cables.
6. Use the SDO SMA connectors to monitor the GN2003S output on a high-speed scope. The SDO output can also be connected to a BERT (Bit Error Rate Tester) for BER measurements.
7. Observe the LOCK and LOS LEDs.

2. Evaluation Board Schematic and PCB Layout

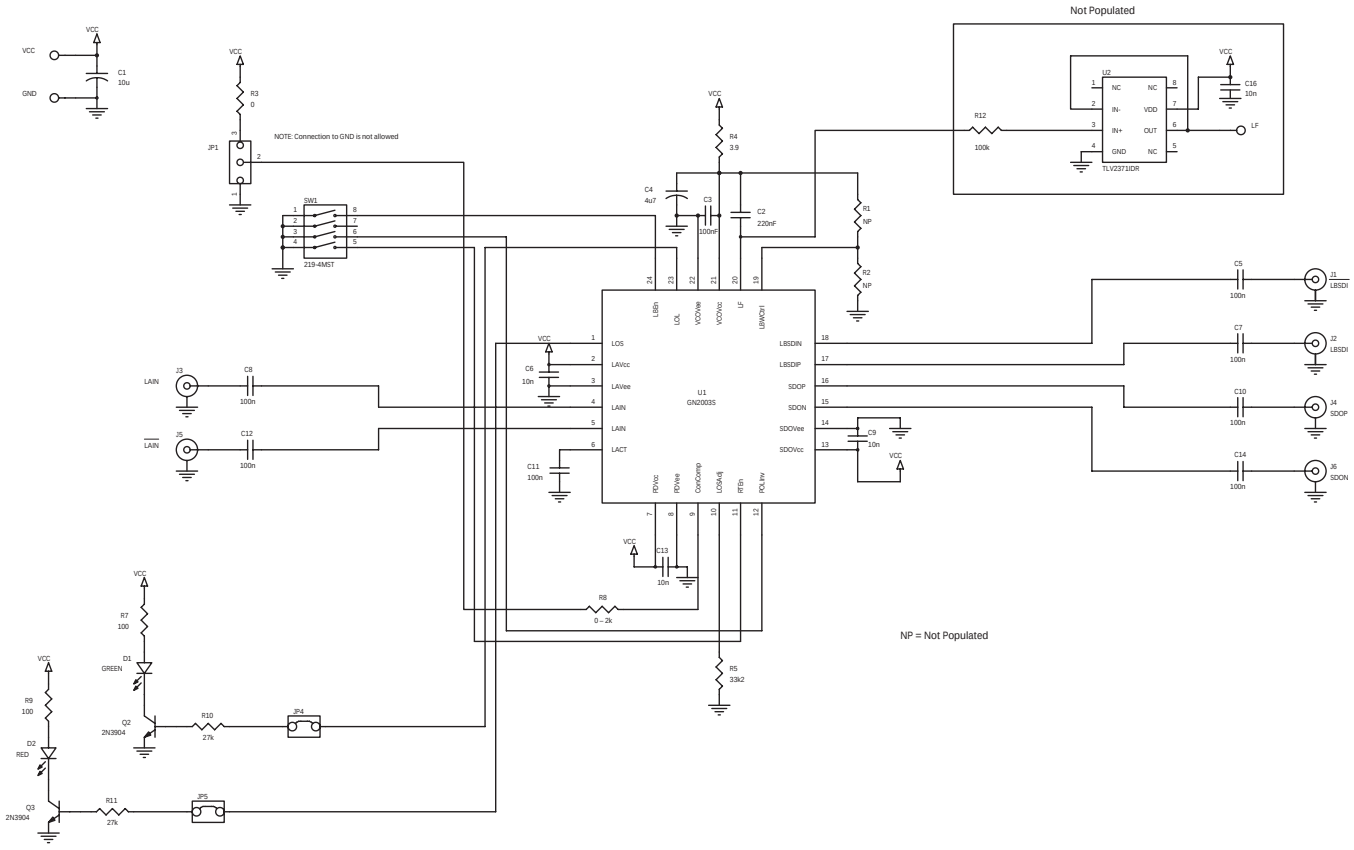


Figure 2-1: XBN2003 Rev 5 Evaluation Board Schematic

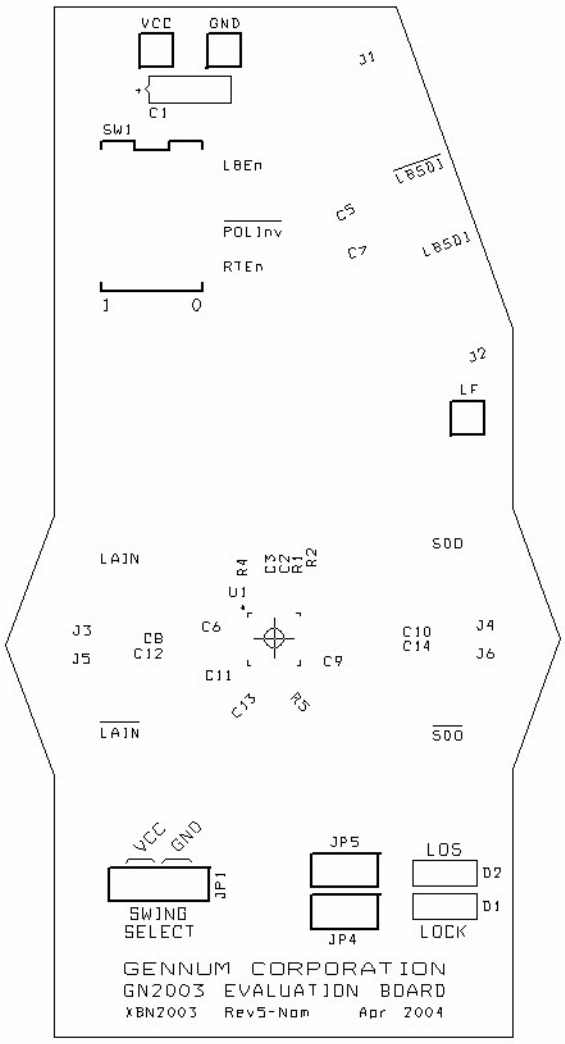


Figure 2-2: . XBN2003 PCB Layout — Top Silk

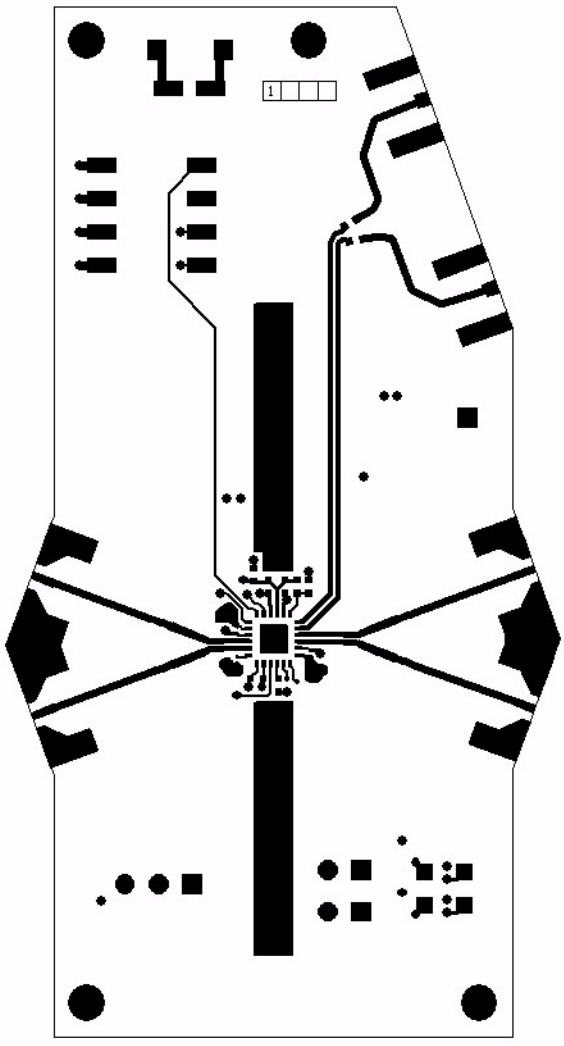


Figure 2-3: XBN2003 PCB Layout — Top Comp.

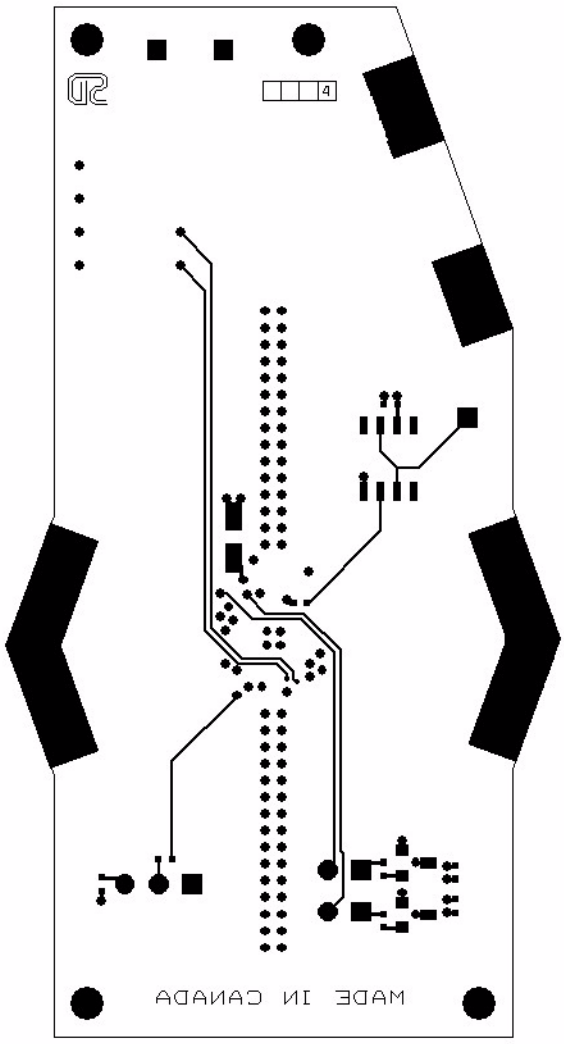


Figure 2-4: XBN2003 PCB Layout — Bottom Components

3. XBN2003 Rev 5 Evaluation Board Settings

The GN2003S SONET XFP Rx Signal Conditioner is designed such that it can operate in various modes.

This section of the document describes the SW1 switch and JP1 jumper settings for some modes.

For more information on the GN2003S operational modes please refer to the GN2003S Data Sheet.

3.1 Mission Mode (Limiting Amplifier Plus CDR With Connector Compensation)

In this mode 9.95Gb/s - 11.3Gb/s data from LAIn input is accepted, the LBSDI input is ignored.

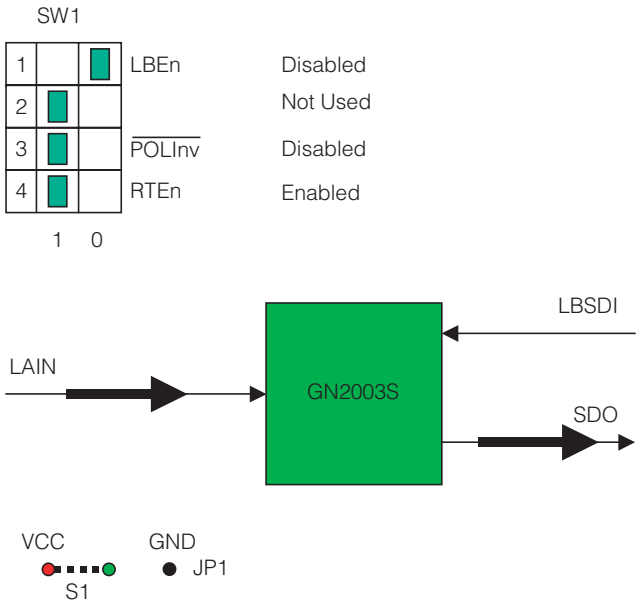
The input data is first amplified and then retimed. The retimed data is available on the SDO output.

The setting shown in Figure 3-1 on page 9 configures the GN2003S device to operate in this mode and also sets the device to:

- Normal (not inverted) polarity on the SDO output (SDOP ← LAINP and SDON ← LAINN)
- The SDO output is high frequency boosted to compensate for losses introduced by the XFP connector and up to 4 inches of a PCB trace. The amount of compensation is controlled by the resistor R8 = 0 - 2kOhm (for maximum to minimum compensation). The exact relation between R4 value and the amount of compensation TBD.

NOTE: When shunt S1 is removed from the JP1, the GN2003S output amplitude will be set to 700mVppd, no compensation.

This mode can be used to evaluate the GN2003S device performance in Mission Mode (Limiting Amplifier plus CDR).



Connector Compensation Enabled.
Note: Connection to GND is not allowed.

Figure 3-1: Settings for Mission Mode

3.2 Loop Back Mode

Figure 3-2 on page 10 shows the setting for Loop Back mode.

In this mode input data is accepted from the LBSDI input, the LAIn input is ignored. The received data is retimed. The retimed data is available on the SDO output.

This setting also sets the device to:

- Inverted polarity on the SDO output (SDOP ← LBSDIN and SDON ← LBSDIP)
- The SDO output amplitude of 700mVppd, no compensation.

In this mode the GN2003S device Loop Back path performance can be verified.

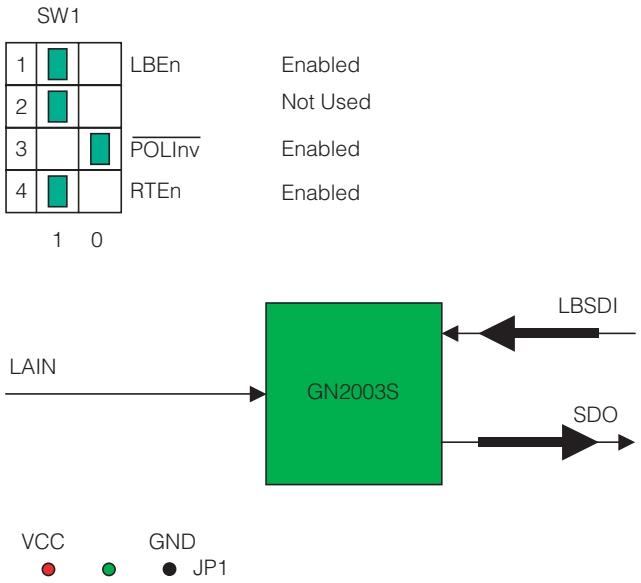


Figure 3-2: Settings for Loop Back Mode

3.3 CDR Bypass Mode

Figure 3-3 on page 11 shows the setting for CDR Bypass mode.

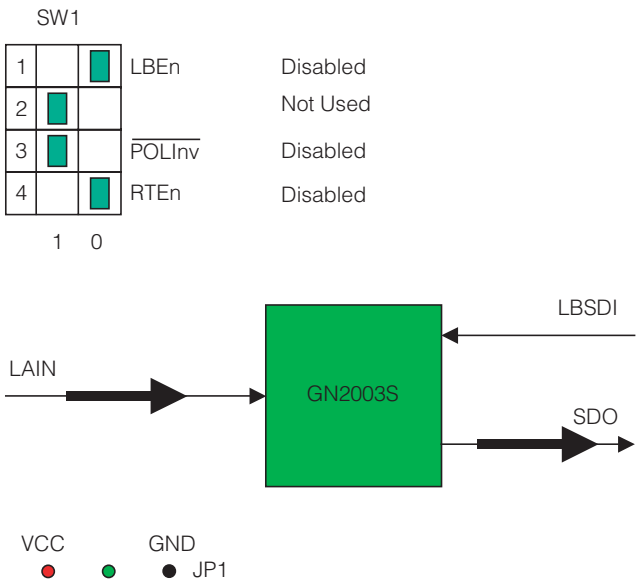
In this mode data from LAIn input is accepted, the LBSDI input is ignored.

The input data is amplified and become available on the SDO output, bypassing the CDR.

This setting also sets the device to:

- Normal (not inverted) polarity on the SDO output (SDOP ← LAINP and SDON ← LAINN)
- The SDO output amplitude of 700mVppd, no compensation.

This mode can be used to evaluate the GN2003S on-chip Limiting Amplifier performance.



Connector Compensation Disabled.
Note: Connection to GND is not allowed.

Figure 3-3: Settings for CDR Bypass Mode

4. Revision History

Version	ECR	Date	Changes and / or Modifications
0	134685	November 2004	New document.
1	136650	April 2005	Updated schematic, removed VCO supply section.

CAUTION
ELECTROSTATIC SENSITIVE DEVICES
DO NOT OPEN PACKAGES OR HANDLE
EXCEPT AT A STATIC-FREE WORKSTATION

DOCUMENT IDENTIFICATION
APPLICATION NOTE
Information relating to this product and the application or design described herein is believed to be reliable, however such information is provided as a guide only and Gennum assumes no liability for any errors in this document, or for the application or design described herein. Gennum reserves the right to make changes to the product or this document at any time without notice.

GENNUM CORPORATION
Mailing Address: P.O. Box 489, Stn. A, Burlington, Ontario, Canada L7R 3Y3
Shipping Address: 970 Fraser Drive, Burlington, Ontario, Canada L7L 5P5
Tel. +1 (905) 632-2996 Fax. +1 (905) 632-5946

GENNUM JAPAN CORPORATION
Shinjuku Green Tower Building 27F, 6-14-1, Nishi Shinjuku, Shinjuku-ku, Tokyo, 160-0023 Japan
Tel. +81 (03) 3349-5501, Fax. +81 (03) 3349-5505

GENNUM UK LIMITED
25 Long Garden Walk, Farnham, Surrey, England GU9 7HX
Tel. +44 (0)1252 747 000 Fax +44 (0)1252 726 523

www.gennum.com