



# LCD Level Shifting on Geode NX DB1500 SBC

## Application Note 306

Sam Siciliano

Logic Product Development

Published: August 2005

### Abstract

When interfacing a Liquid Crystal Display (LCD) panel to the Geode NX DB1500 Single Board Computer (SBC), the LCD controller output signals must be level-shifted in order to provide the correct signal drive levels for the LCD panel being used. A small Printed Circuit Board (PCB) containing signal transceiver Integrated Circuits (ICs) can be used to provide the necessary level shifting. This PCB can be mounted either on the Geode NX DB1500 SBC, or on the display being used. Different revisions of the Geode NX DB1500 SBC use different power connections to a level-shifting PCB.

This file contains source code, ideas, techniques, and information (the Information) which are Proprietary and Confidential Information of Logic Product Development, Inc. This information may not be used by or disclosed to any third party except under written license, and shall be subject to the limitations prescribed under license.

No warranties of any nature are extended by this document. Any product and related material disclosed herein are only furnished pursuant and subject to the terms and conditions of a duly executed license or agreement to purchase or lease equipments. The only warranties made by Logic Product Development, if any, with respect to the products described in this document are set forth in such license or agreement. Logic Product Development cannot accept any financial or other responsibility that may be the result of your use of the information in this document or software material, including direct, indirect, special or consequential damages.

Logic Product Development may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering the subject matter in this document. Except as expressly provided in any written agreement from Logic Product Development, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

The information contained herein is subject to change without notice. Revisions may be issued to advise of such changes and/or additions.

© Copyright 2005, Logic Product Development, Inc. All Rights Reserved.

### REVISION HISTORY

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	Sam Siciliano	Initial Release	HAR	11/21/2005

# 1 Introduction

The SiS 741CX Northbridge Chip on the AMD Geode™ NX DB1500 Single Board Computer drives the LCD lines (on connector J11) at 1.8V logic levels. Because most LCD panels require 3.3V or 5.0V drive signals, a small printed circuit board (module board), which implements signal transceivers, is needed to shift the logic levels to the proper values. This document describes the functionality of this module board and addresses additional considerations for using the Geode NX DB1500 to drive an LCD panel.

## 2 Module Board

### 2.1 Block Diagrams

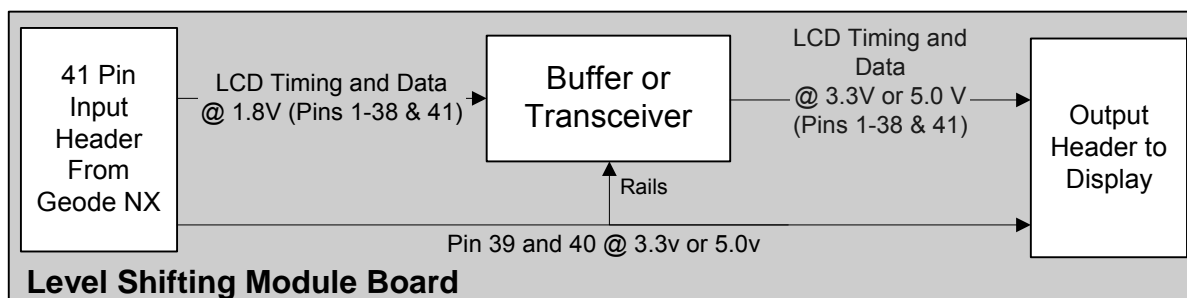


Figure 1: Functional Block Diagram for Geode NX SBCs (except Part #1001387\*)

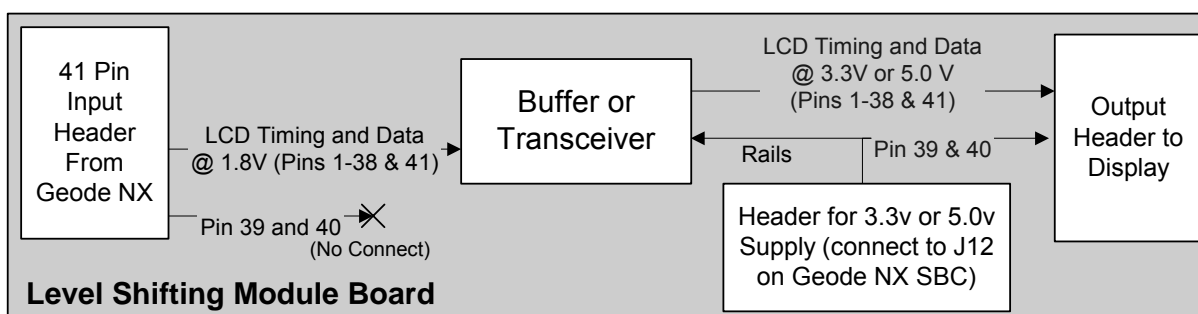


Figure 2: Functional Block Diagram for Geode NX SBC Part #1001387\*

\*Note: The part number is indicated on the part number sticker located on the Geode NX board.

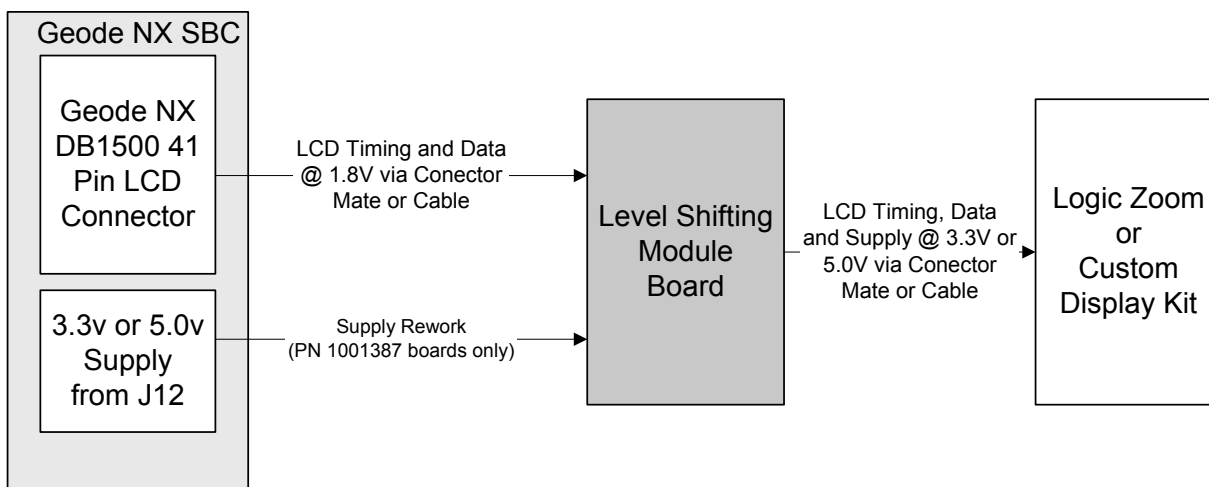


Figure 3: Connecting the Level Shifting Module Board

## 2.2 Module Board Functionality

The module board needs to use buffers or transceivers, such as Philip's 74ALVC164245, to shift the LCD timing and data levels from 1.8v to 3.3v or 5.0v (depending on the specific LCD display requirements).

Because SBC's with part number 1001387 do not provide supply voltages on pins 39 and 40 of the input header, a header can be placed on the module board to get the supply voltages from jumper J12 on the Geode NX SBC. This can be accomplished using a custom cable or rework (see Figure 2 above).

**IMPORTANT NOTE: If the supply voltage is connected directly from J12, the power will not be cycled during the LCD initialization sequence - it may violate the LCD power sequence specification. This rework should be used for prototyping only.**

## 2.3 Module Board Location

The module board can be mounted either on the Geode NX SBC or to the Logic Zoom™ Display Kit (or custom display). If the board is built with a 41 pin Hirose connector, it can connect directly to the corresponding mate on the Geode NX SBC. Alternately, if the board is built with a 60 pin 0.1" female connector, it can connect directly to the corresponding mate on the Zoom Display Kit. There are benefits to each option:

- If the module board is attached to the display kit, the extra space allows for a larger PCB in the module board design.
- If the module board is attached to the Geode NX SBC, and the supply cable for part number 1001387 boards is needed, the length of the supply cable can be kept to a minimum.

## 2.4 Connectors and Cables

The Geode NX SBC 41 pin LCD connector has the Hirose part number DF9-41P-1V-54 and mates with the Hirose header DF9-41S-1V-54. The Logic Zoom Display Kits use a 60 pin 0.1" header. Regardless of where the module board will be located, a custom cable is needed to connect the module board to either the LCD display or the Geode NX SBC.

# 3 Software Considerations

## 3.1 BIOS and Software LCD Support

The AMI BIOS, version 0AMI4007, that ships with the AMD Geode NX SBC part number 1001387 does not support the LCD output. The system will need to be updated with the released BIOS that supports LCD output.