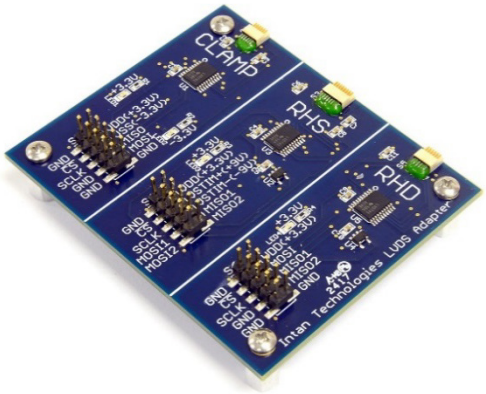
LVDS Adapter Board



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The Intan LVDS Adapter Board is a hardware development tool that translates standard TTL or CMOS-level digital signals to low-voltage differential signals (LVDS) used by Intan RHD2000, RHS2000, and CLAMP headstages. This can be useful when interfacing Intan headstages to commercial microcontrollers or FPGAs since most Intan headstages are hardwired to use LVDS signals. While LVDS signals are essential for reliable high-speed digital signaling over long SPI interface cables, few microcontrollers support LVDS I/O.

Board Overview

Figure 1 shows a detailed view of the LVDS Adapter Board. The board has three independent units for the Intan CLAMP, RHS2000, and RHD2000 series chips. Each unit is electrically isolated from the others (even the grounds are not connected). Each section has three parts: (1) an Omnetics connector to interface with an Intan headstage or SPI interface cable; (2) Texas Instruments SN65LVDT chips to translate between LVDS and CMOS-level digital signals; and (3) a 0.1" male header to interface with custom electronics under development.

Users must provide +3.3V to power the SN65LVDT chips on the Adapter Board. This voltage is also used to power the Intan headstages. The CLAMP headstages also require a -3.3V supply. The RHS2000 stim/record headstages require ±9V supplies.

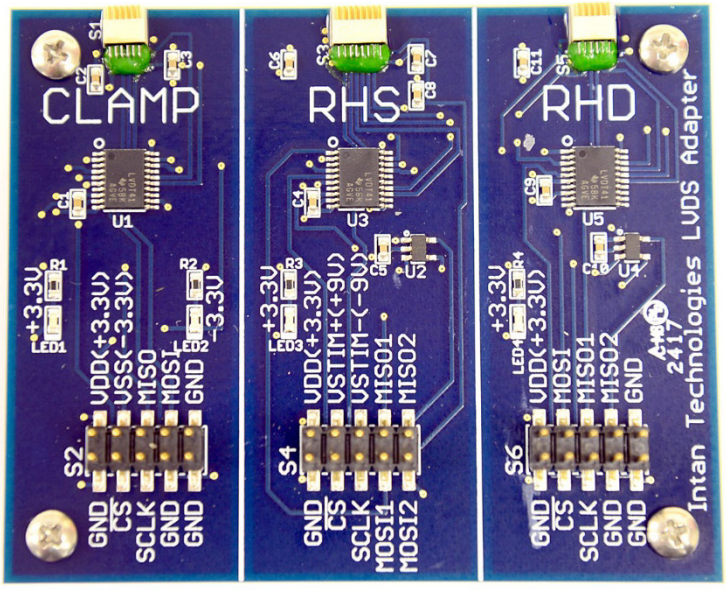

Figure 1. Top view of Intan LVDS Adapter Board. The Omnetics connectors (top) interface with Intan headstages or SPI interface cables. The 0.1" male headers (bottom) connect to custom hardware under development.

Figure 2 shows a simplified schematic of the CMOS-to-LVDS interface drivers and receivers incorporated on the Adapter Board. CMOS-level signals for $\overline{CS}$, SCLK, and MOSI must be provided by the user through the 0.1" header. The logic levels for these signals are somewhat flexible: a logic "low" must be in the range of 0 to 0.8V, while a logic "high" must be in the range of 2V to 5V. These are converted to LVDS signals and sent over the Omnetics connector. The MISO signal(s) received from the Omnetics connector are properly terminated by a built-in termination resistor and converted to a 3.3V-level CMOS signal that appears on the 0.1" header.

For detailed information on the CMOS-to-LVDS conversion circuitry, refer to the Texas Instrument datasheet for the SN65LVDT41 and SN65LVDT2 integrated circuits.

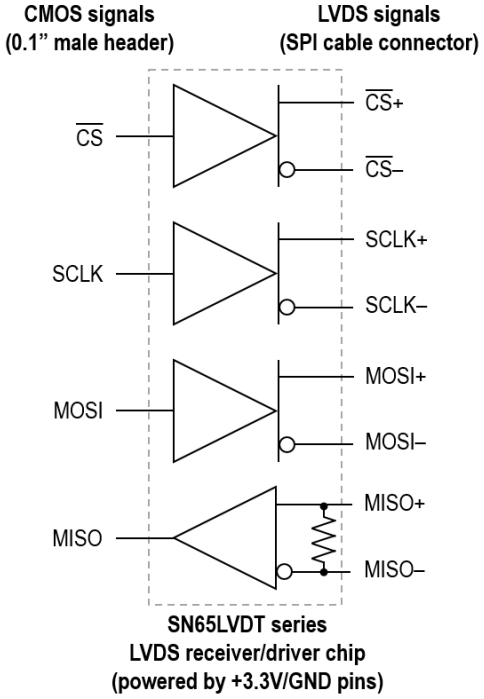

Figure 2. Simplified schematic of LVDS Adapter Board circuitry.