



## Single Channel 18-Bit LVDS TX Core

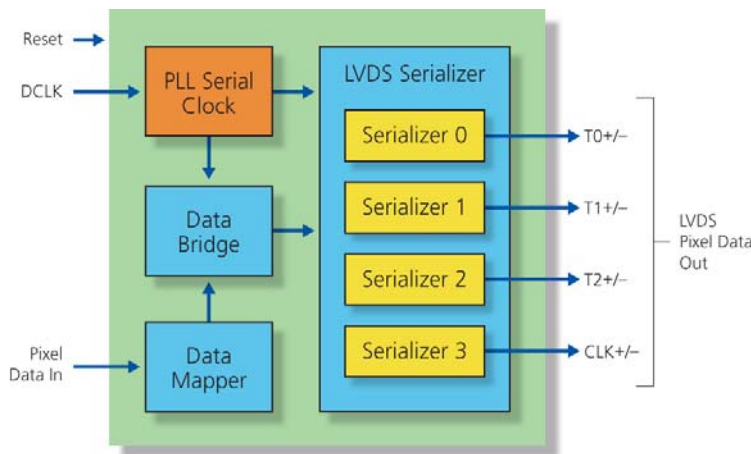
**Actel**  
SolutionPartner

Select Actel FPGAs are capable of driving LCD displays directly via LVDS when paired with one of Attodyne's LVDS TX cores. This saves the costs of an external LVDS TX chip and the associated PCB real estate. The Single channel LVDS TX core is designed for 18-bit, LVDS-enabled displays that require a single LVDS channel (four LVDS TX pairs) per the Panel Standardization Working Group (PSWG) specification.

Variants of this core support Single channel 24-bit interfaces as well as Dual-Channel 18-bit or 24-bit LVDS interfaces.

Leveraging Attodyne's intimate knowledge of Actel's FPGAs, an astounding 455Mbps per TX-pair serial data rate is possible with standard speed-grade FPGAs. This means that a 1024x768 LCD can be driven directly with an inexpensive Actel FPGA. Up to approximately 600Mbps per LVDS TX pair is possible with faster speed-grade parts.

**Block Diagram**



The LVDS TX core accepts a standard single-ended pixel interface, including all of the sync signals. A data-mapper arranges the pixel data in preparation for LVDS serialization according to the PSWG specification. The associated DCLK (or pixel clock) is multiplied up for use as the reference clock for the LVDS serializers. Since a specific phase relationship between DCLK and the serial clock cannot be guaranteed, the data bridge permits reliable crossing of the clock boundaries for the data. Finally, the pixel data is serialized and transmitted down its assigned LVDS port.

This product brief highlights Attodyne's Single channel, 18-bit LVDS TX core however, other types are available. Some LVDS-enabled displays do not follow the PSWG specification. Contact Attodyne for custom versions of this core.

## Features

### Drive LVDS-Enabled LCDs Directly

- Leverage Actel's LVDS I/O
- Eliminates external LDVS TX chips

### High-Serial Data Rates

- 455Mbps per TX pair with standard speed-grade FPGA
- Upwards of 600Mbps on faster part

### Easy to Interface

- Accepts standard single-ended pixel interface
- Simple connection to Attodyne's VTG cores

### Available Configurations

- Single channel, 18-bit LVDS core
- Single channel, 24-bit LVDS core
- Dual channel, 18-bit LVDS core
- Dual channel, 24-bit LVDS core

## Applications

- Medical Imaging
- Notebooks
- Kiosks
- Casino Machines
- ATMs
- POS Advertising
- Avionics
- Military



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### Device Utilization

| Family    | Device | Tiles | Clock<br>Globals | I/Os | PLLs | Block<br>RAM | Utilization |
|-----------|--------|-------|------------------|------|------|--------------|-------------|
| IGLOO™    | AGL600 | 264   | 2                | 31   | 1    | 0            | 1.9%        |
| ProASIC®3 | A3P250 | 264   | 2                | 31   | 1    | 0            | 4.3%        |
| Fusion    | AFS250 | 264   | 2                | 31   | 1    | 0            | 4.3%        |

### Deliverables

- Complete IP Datasheet
- Actel Optimized Netlist
  - Netlist for target FPGA in EDIF, Verilog, or VHDL format
- RTL Source Code
  - VHDL or Verilog source code
  - Functional verification testbench
  - Complete Libero® Integrated Design Environment (IDE) project

### About Attodyne

As an Actel Solution Partner, Attodyne licenses IP cores relating to the processing, transmission, distribution, and display of video data. Attodyne's design experience and capabilities span from ultra-low noise analog circuits to 4 Gbps fiber optic communications; however, video-related FPGA work is its primary focus. In addition to licensing IP cores, Attodyne also offers reference designs, prototypes, design consultation, and product development.

Attodyne will help guide you early in your project to extract the maximum feature set that will minimize the design cost for both hardware and firmware/software. Attodyne recommends Actel's FPGAs, as Actel's Flash based FPGA architecture is uniquely suited to video/LCD applications. Actel also provides superior support and creative flexibility to match its customer's needs. Due to a close working relationship with Actel, Attodyne has extensive knowledge of its Flash FPGAs as well as Actel's roadmap. This base of knowledge is extremely important when making long-term product and manufacturing decisions.