



NXP mobile interface link PTN3700

Robust serial link for mobile applications

A complete, advanced 24-bit serial video link offering low wire count, low power, and low EMI, plus compelling pixel-processing features.

Key features

- ▶ Operates from a single power supply of 1.8 V \pm 150 mV
- ▶ Configurable as transmitter or receiver
- ▶ One, two, or three differential SubLVDS high-speed serial lanes
- ▶ One differential source-synchronous pixel clock
- ▶ Configurable aggregate data bandwidth up to 1.65 Gbps
- ▶ Operating temperature range: -40 to +85 °C

Applications

- ▶ Mobile phones with high-resolution displays
- ▶ PDAs
- ▶ General-purpose serial/deserializer

The NXP mobile interface link PTN3700 creates a robust serial link in cellular handsets and other mobile applications that use a higher-resolution, 18- or 24-bit screen to display video data. Used to replace a cumbersome parallel link, the PTN3700 supports 24-bit color video (16.7 million colors) in an elegant, low-power format that saves space and simplifies design-in while satisfying EMI requirements and reducing power consumption. Additionally, an advanced pixel processing function improves display performance, enabling 24-bit rendering in an 18-bit display format

A single pin configures the PTN3700 as a transmitter or a receiver. The transmitter is typically placed in the main unit, where the display processor or application engine resides, with the receiver near the display itself in the display sub-assembly.

To make design-in more flexible, the PTN3700 is available in two package options. For PCB mounting, it is housed in a 56-ball TFPGA package that measures only 4.0 x 4.5 mm. For flex foil mounting in the display sub-assembly, the IC can be delivered as a bumped bare die.

When functioning as a transmitter, the PTN3700 serializes up to 24-bit parallel CMOS video data, along with control data and two multi-purpose auxiliary bits, and drives the serial output data and clock to differential, subLVDS outputs.

When functioning as a receiver, the PTN3700 deserializes the incoming serial data and outputs the original data, with optional parity checking and correction, to its parallel CMOS outputs.

Value-added features

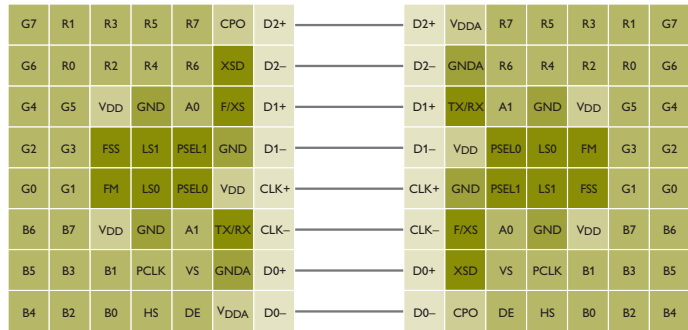
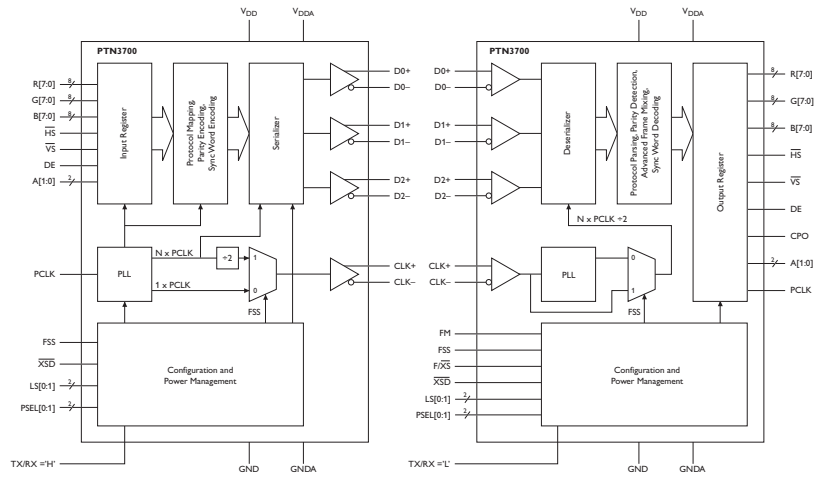
Configurable signal mirroring makes it easy to pick the signal order that best fits the application, especially when routing parallel and serial wires in a single layout plane. Pinning Select pins mirror the signal order of the parallel and serial lines independently, so Receiver and Transmitter signals can be opposed without crossing any wires — even if the link pair combines top- and bottom-side mounting.

Advanced Frame Mixing is a patent-pending algorithm that converts 24-bit video data to a modified bit stream that allows 18-bit displays to render the full 24 bits (16.7 million colors) of color resolution. When enabled, the algorithm encodes the color information of the two LSBs of the eight-bit-per-color word (R, G, or B) into the LSB of the new six-bit-per-color word by applying temporal and spatial modulation to the new six-bit LSB. As a result, for still and relatively slow-moving video, where color depth is the most critical, the full 16.7 million-color palette of the 24-bit source is rendered perfectly, producing visibly smoother color gradations and transitions.

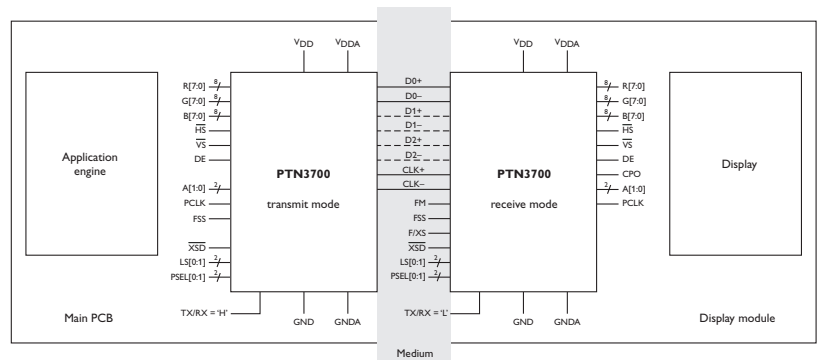
The PTN3700 also supports scalable bandwidth. Depending on the type of target display (CIF, QVGA, HVGA, WVGA, XGA, etc.), the PTN3700 can be set to transmit via one, two, or three serial data channels such that the number of wires, the actual bandwidth transmitted, and the power consumption are always at their lowest possible values. Table 1 shows examples based on 60 frames per second.

Scalable bandwidth

Mode	Number of serial data channels	Pixel clock frequency (MHz)	Aggregate bandwidth (Mbps)	Display modes (example)
00	1	4 - 15	120 - 450	QVGA, HVGA
01	2	8 - 30	240 - 900	VGA, WVGA
10	3	20 - 55	600 - 1650	SVGA, XGA



The PTN3700 provides the transmitter (left) and receiver (right) functions while two instances complete the link. Pinning can be mirrored in a number of ways to facilitate single-plane routing, which is especially important in flex-foil designs.



Typical application for video data transmission. The left-hand PTN3700 is configured as a transmitter, the right-hand one as a receiver.