Application Brief

TI DLP® Pico™ Technology for Smart Displays

Smart speakers are becoming a common fixture in households as consumers continue to adopt smart home solutions. With on-demand virtual assistants and quality audio performance, incorporating display functionality is a logical next step for these “out all of the time” devices.

The first generation of smart displays incorporate relatively small 7-10” screens. Bigger screens, for example 15-40”, would be helpful for viewing from farther distances. However, larger flat panel displays would lead to larger smart displays that may grow too big for areas with limited space, like a kitchen counter top or a side table, or too bulky to be aesthetically pleasing. A solution to this problem is pico projection – it can enable large, on-demand displays from small devices.

TI DLP® Pico technology enables small, high-performance, low-power projection smart display solutions. A DLP Pico digital micromirror device (DMD), with up to millions of micromirrors, creates the image in sync with color-sequential illumination. A DLP controller on a nearby PCB accepts incoming video via a MIPI DSI or parallel RGB interface from a processor.

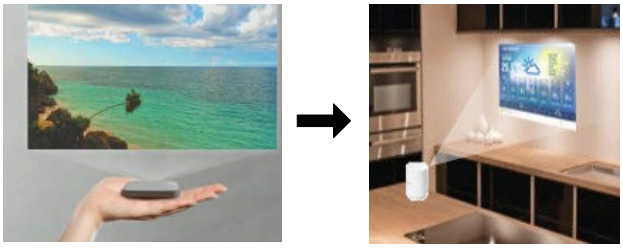
Features and Benefits

- High image quality
  - High contrast and wide color gamut enable vibrant images
  - Film-like image: high fill factor (>90%)
  - Resolution options from nHD (640 x 360) to 4K
- Flexibility and scalability
  - Short and ultra-short throw optics enable a large image from a short distance
  - Virtually, any surface can become a display
  - Compact optical engines can be integrated without compromising product size and aesthetics
- High optical efficiency
  - Low-power, high-brightness displays
  - Minimal thermal management required, including fan-free designs with high performance

Recommended Chipsets for Smart Displays

For the smallest display systems, DLP Pico chipsets that include a 0.2”-class micromirror array diagonal are recommended. These solutions enable extremely compact optical systems and the lowest possible power consumption, while 0.3” chipsets offer higher brightness.

Class	DMD	Resolution	Controller
0.2”	DLP2000	640x360	DLPC2607
	DLP2010	854x480	DLPC3430/3435
	DLP230GP	960x540	DLPC3432
	DLP230KP	1280x720	DLPC3434
	DLP230NP	1920x1080	DLPC3436
0.3”	DLP3010	1280x720	DLPC3433/3438
	DLP3310	1920x1080	DLPC3437



Create a vivid, high brightness 20-40” diagonal image with a .2”-class, 50-cc optical engine.

Additional Technical Resources

- DLP® Pico™ technology for smart speaker displays whitepaper
- TI DLP® Display Brightness Requirements and Trade-offs video
- Optical reference design for .23” digital micromirror device (DMD) video
- Smart Speaker projection techniques video
- Creating a smart speaker projector with natural convection cooling video

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