

Free your imagination—  
the simple way to evaluate, develop and  
integrate Microvision pico projection technology  
into your products.

## About Microvision

Microvision is a world leader in the innovation of a new generation of display and imaging products for mobile applications.

### Our Mission

We are focused, agile, and boundaryless in our pursuit of innovative display and imaging solutions that dramatically improve how our customers solve real problems.

### Our Vision

Our products address the unmet needs facing growing mobility markets. Namely, consumers want a far better viewing experience than they currently get from traditional small displays on their mobile devices. Microvision offers OEMs in the telecommunications, consumer electronics, automotive, and avionics markets customized design and development of our proprietary display engine, PicoP®. The PicoP display engine enables an ultra-miniature video projector capable of producing color rich, high resolution, large images, but small and low-power enough to be embedded directly into mobile devices, such as cell phones.

Other potential display applications based on PicoP technology are numerous and include tiny projectors embedded into or used as accessory displays for mobile devices such as personal media players, gaming devices, laptops, and DVD players.

We are also working to leverage the PicoP display engine into vehicle displays, including automotive and aerospace head-up displays, as well as wearable full-color displays designed as eyewear.

To learn more, visit [www.microvision.com](http://www.microvision.com)

## Company Details

<b>Established</b>	1993
<b>NASDAQ</b>	MVIS
<b>Headquarters</b>	Redmond, Washington USA
<b>Employees</b>	140
<b>Patent Portfolio</b>	Over 115 patents issued
<b>Certifications</b>	ISO 9001



## The Microvision PicoP® Display Engine (PDE)

For manufacturers who want to bring the next generation of ground-breaking mobile devices to market, Microvision provides the PicoP Display Engine that is designed to meet the exacting standards OEMs require for high-volume embedded laser projection applications where size and display performance are critically important design considerations.

### PicoP® Display Engine Features and Benefits:

#### Infinite focus range

- » Delivers “always in focus” operation with laser based light sources

#### Wide horizontal projection angle

- » 44 degrees provides image size equal to projection distance, allowing for a big screen experience

#### Wide color gamut

- » Laser light sources provide 64K color depth with 200% wider color gamut than standard NTSC

#### Embeddable form factor

- » 7.6 mm (max) x 50 mm x 44 mm (H x W x L)
- » Among the smallest projection display engines in the world, making it simple to integrate into virtually any device

#### Digital RGB video interface

- » Digital RGB interface for the highest image quality and easy integration with embedded media and application processors



PicoP® Display Engine pictured without covers.

### PicoP® Display Engine Specifications

Projected Image	<b>Resolution</b>	WVGA (848 x 480), Native WVGA (800 x 480), VGA (640 x 480)
	<b>Aspect Ratio</b>	16:9 Native
	<b>Brightness</b>	15 Lumens
	<b>Light sources</b>	Red 640nm, Green 532nm, Blue 450nm lasers
	<b>Refresh Rate</b>	~ 60 Hz
	<b>Color Depth</b>	64K colors
Size	<b>Full Screen Contrast</b>	> 5000:1
	<b>W x L</b>	50 x 46.5 mm
Interfaces	<b>Optical Engine Height</b>	7.6 mm (max)
	<b>Data</b>	Digital RGB (RGB 565)
Power	<b>Control</b>	USB UART
	<b>Single Supply</b>	2.7-4.2V
Regulatory	<b>Class 2 Laser product</b>	Per IEC 60825-1:2007 and CDRH 1040.10, 1040.11 with laser Notice 50. The PDE is a Class 2 Laser Product.

## Microvision PicoP® Display Engine Evaluation Kit (PEK)

The PEK is an evaluation platform demonstrating the capabilities of the PDE. PEK is designed for easy connectivity to various display generators, such as laptops/netbooks, smart phones, video cameras, media players, and much more. PEK allows rapid prototyping of PDE-enabled mobile devices.

### The PEK Includes:

- PDE module
- VGA/Component Video Interface
- USB control interface
- Software Development Kit (SDK)
- Power supply (110V – 240V input, 5V output)

### PEK Features and Benefits:

#### Direct connection to a PC

- » Connects to VGA for out-of-box development

#### Sync signal output

- » Connects to a sensor, camera or similar to enable development of natural user interfaces or structured lighting applications



PicoP® Display Engine Evaluation Kit (PEK)

## Microvision PicoP® Display Engine Development Kit (PDK)

The PDK is designed to provide all the tools necessary for embedded systems development with PDE, enabling a host of portable projection and imaging devices that span consumer, automotive and aviation electronics, medical devices, and industrial imaging solutions. The PDK provides all of the hardware and software necessary to produce a fully functional embedded device.

### The PDK Includes:

- PDE module
- Computer-On-Module interface board
- BeagleBoard Computer-on-Module system
- Software Development Kit (SDK)
- SD card with operating system, SDK, and sample applications
- Power supply (110V – 240V input, 5V output)



Computer-on-Module BeagleBoard® (above)

### PDK Features and Benefits:

#### Laptop-like performance in a small embeddable Computer-on-Module form factor

- » OMAP3530 processor featuring ARM Cortex-A8 (same CPU core as in iPhone, Palm Pre, and Nokia N900)
- » 256MB low-power DDR Memory, 256MB Flash
- » OpenGL® ES 2.0 capable 2D/3D graphics accelerator
- » HD video capable DSP

#### Extensible to satisfy your imagination

- » Compatibility with standard USB peripherals, such as keyboards, mice, network adapters, (WiFi, Ethernet, Bluetooth), web cams, etc.
- » MMC+/SD/SDIO interface for memory expansion

#### Hardware platform for complete projector-enabled systems

- » Software development with standard embedded Linux or Android tool flows
- » Active developer network with community driven support and expertise

## The Microvision PicoP® Software Development Kit (SDK)

The PicoP Software Development Kit (SDK) facilitates the creation of innovative projector-enabled applications. The SDK supports both PC-based (PEK) and embedded development environments (PDK).

### The SDK includes:

- » Software libraries
- » Application Programming Interfaces (APIs with header files)
- » Sample applications (source code)
- » Documentation: *Getting Started Guide*, *Programmer's Reference Guide* and *PDE Programmer's Guide*

The SDK provides control of projector functionality and settings, including display control functions (brightness, aspect ratio, color mode, gamma, keystone correction settings, etc.); input control functions; rendering functions (OSD, test pattern generation, etc.); and system management functions (system status, system information, software upgrade, etc.). For a comprehensive list of SDK functions, please refer to the *PDE Programmer's Guide*, Document Number DC0127564.

### PicoP SDK Details

SDK Version	Hardware Platform	Operating System	API	PDE Tool
Windows	PC Laptop Netbook	Windows XP SP2 Windows Vista Windows 7	C	PEK
Linux (Desktop)		Ubuntu Linux 7.10 or later	C	
Linux (Embedded)	OMAP35xx BeagleBoard OMAP35xx Gumstix	Ångström Linux	C	PDK
Android	OMAP35xx BeagleBoard	Android	Java	

## Ordering Part Numbers and Descriptions:

### PDE Reference Module

- » MV2WV110S-E1: PDE reference module without media module

### PDE Evaluation Kit (PEK)

- » MV2WV110S-E2: PDE reference module with VGA/component media module

### PDE Development Kit (PDK)

- » MV1WV110S-D1: PDE reference module with Digi-Key® Beagle Board development platform

To inquire about ordering any of the evaluation and development tools, visit [www.microvision.com/pde](http://www.microvision.com/pde)