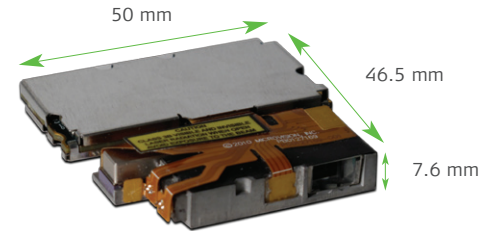


**Free your imagination – the simple way to evaluate, develop and integrate MicroVision PicoP® laser display technology into your products.**

## 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

## PicoP® Display Engine Features and Benefits:

### Infinite focus range

- Delivers “always in focus” images with laser based light sources, ideally suited for mobile entertainment and gaming applications

### Compact size

- Among the smallest projection display engines in the world, making it simple to integrate into virtually any device, particularly small mobile form factors

### Wide horizontal projection angle

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

### Wide color gamut

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

### Digital RGB video interface

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

For rapid evaluation and prototyping, MicroVision provides a variety of tools that are designed to help developers evaluate and embed the PicoP Display Engine into products.

## PicoP® Display Engine Specifications:

Projected Image	Resolution	WVGA (848 × 480) Native WVGA (800 × 480) VGA (640 × 480)
	Aspect Ratio	16:9 Native
	Brightness	15 Lumens
	Light Sources	Red 640 nm, Green 532 nm, and Blue 450 nm lasers
	Refresh Rate	~ 60 Hz
	Color Depth	64K colors
	Full Screen Contrast	> 5,000:1
Dimensions	W × L × H	50 × 46.5 × 7.6 mm
	Optical Engine Height	7.6 mm (max)
Interfaces	Data	Digital RGB (RGB 565)
	Control	USB, UART
Power	Single Supply	2.7 - 4.2 V
Regulatory Compliance	Class 2 Laser Product	Per IEC 60825 - 1:2007 and CDRH 1040.10, 1040.11 with Laser Notice 50

# PicoP® Display Engine Evaluation & Development Tools

IMAGE BY  
**PICOP**®

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

The PEK is an evaluation platform demonstrating the capabilities of the PicoP Display Engine (PDE). The PEK is designed for easy connectivity to various video sources such as laptops, tablets, smart phones, video cameras, media players, and much more. The PEK is designed to allow for greater efficiency in software and hardware development cycle times.

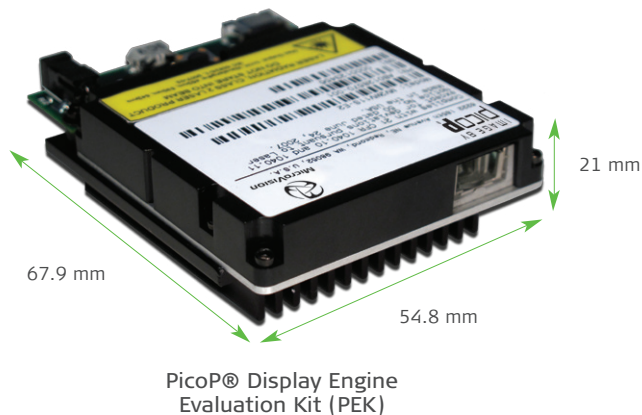
### The PEK includes:

- PicoP Display Engine (PDE) Module
- VGA/Component Video Interface
- USB Control Interface
- USB Thumb Drive with Software Development Kit (SDK)
- USB 2.0 to micro-USB Cable
- VGA to DB9 Cable
- Power Supply (110 V - 240 V input, 5 V output)

### PEK Features and Benefits:

#### Direct connection to a PC

- Connects to VGA for out-of-box development

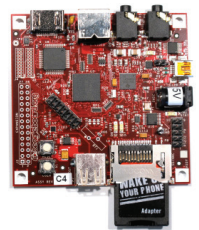


## MicroVision PicoP® Display Engine Development Kit (PDK)

The PDK is designed to provide all the tools necessary for embedded systems development with the 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 display solution.

### The PDK includes:

- PicoP Display Engine (PDE) Module
- BeagleBoard® Computer-on-Module System
- Computer-on-Module Interface Board
- USB Thumb Drive with Software Development Kit (SDK)
- SD Card with Operating System, SDK, and Sample Applications
- USB 2.0 to micro-USB Cable
- IDC10 to DB9M Bulkhead (RS-232) Cable
- DB9F Null Modem (RS-232) Cable
- USB to DB9M RS-232 Cable
- HDMI Male to DVI-D Male Cable
- Power Supply (110 V - 240 V input, 5 V 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
- 256 MB low-power DDR Memory, 256 MB 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), webcams, 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

#### Sync Signal output

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

# PicoP® Display Engine Evaluation & Development Tools



## MicroVision PicoP® Software Development Kit (SDK)

The PicoP Software Development Kit (SDK) facilitates the creation of innovative projector-enabled applications with the PicoP Display Engine (PDE). The SDK supports both the PC-based PDE Evaluation Kit (PEK) and the embedded PDE Development Kit (PDK) with a range of software development environments.

### 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*

### SDK Features and Benefits:

The SDK provides control of projector functionality and settings.

- Brightness
- Aspect ratio
- Color mode
- Gamma and keystone correction
- Input control functions

Rendering and system management functions are made available as well.

- On screen display (OSD)
- Test pattern generation
- System status
- System information
- Software upgrades

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 10.04 or later	C	
Mac OS X	Mac Pro MacBook Mac Mini	Mac OS X 10.6	C	
Linux (Embedded)	OMAP35xx BeagleBoard	Ångström Linux	C	PDK
Android	OMAP35xx BeagleBoard	Android	Java	

## Ordering Part Numbers and Descriptions

### PicoP Display Engine (PDE) Reference Module

- MV2WV110S-E1: PDE reference module without media module

### PDE Evaluation Kit (PEK)

- MV2WV110S-E2: PDE reference module with VGA media module

### PDE Development Kit (PDK)

- MV1WV110S-D1: PDE reference module with BeagleBoard® development platform

To inquire about any of the evaluation and development tools, visit [microvision.com/pde](http://microvision.com/pde) or place your orders at [microvision.com/store](http://microvision.com/store)



## Overview

MicroVision offers the PicoP<sup>®</sup> Display Engine to power next-generation display and imaging products for pico projectors, vehicle displays and wearable displays that interface with mobile devices. As the world's first commercial ultra-miniature laser-scanning technology, MicroVision's PicoP display uses highly efficient laser light sources to display vivid widescreen images with high contrast and brightness from 12 to 100 diagonal inches in size.

MicroVision's products address the unmet need facing growing mobility markets—consumers want a far bigger viewing experience than they currently get from small mobile device displays. Considering the growth of YouTube, Flip Video cameras and Apple devices, consumers are increasingly creating more content themselves and sharing those creations in the real-world has meant squinting and huddling around a small screen.

Industry studies have shown a correlation between screen size and an individual's willingness to view long-form video content. The studies demonstrate that consumers are more likely to consume and share video content on larger format displays. With market research forecasting video to become nearly one-quarter of mobile data traffic by 2012, MicroVision's PDE offers a compelling video solution for OEMs wanting to provide consumers with a big screen experience.

The PicoP Display Engine is small and low power enough to be embedded directly into devices such as smartphones, media players, camcorders and tablets. MicroVision is collaborating with Original Equipment Manufacturers (OEMs) in the telecommunications, gaming and consumer electronics markets to create new experiences that free consumers from the small screen in addition to creating new opportunities for carriers, content producers and brand marketers.

In vertical markets, such as automotive, aviation, medical and defense, there is strong demand for innovative display and imaging products that overcome today's limitations. For example, the PicoP laser display engine can be embedded into a vehicle or integrated into a portable standalone aftermarket device to create a head-up display (HUD), placing critical information directly on the windshield of an automobile or into see-through eyewear displays. MicroVision is working closely with various automotive suppliers and commercial introduction of an in-vehicle HUD using PicoP technology is targeted for the consumer market in 2012. The company has also entered into contracts with commercial and government customers to develop high-definition, see-through eyewear displays.

## Company Highlights

Established	1993
NASDAQ	MVIS
Headquarters	Redmond, Washington, USA
Patent Portfolio	Over 500 patents issued and pending
Certifications	ISO 9001



For sales information, contact [sales@microvision.com](mailto:sales@microvision.com)