



ALT Software Inc.

# Embedded OpenGL Driver Kits

ALT Software provides a family of embedded OpenGL 1.x, OpenGL ES 1.1(fixed function), OpenGL ES 2.0 (fully programmable), OpenGL SC and OpenVG display drivers for embedded computing systems that employ hardware accelerated graphics. Performance-tuned for resource constrained devices, these graphics libraries are fully customizable and offer native support for several system configurations (i.e. CPUs / graphics processors / operating systems). ALT's 2D/3D OpenGL drivers are used in aerospace and defense systems, consumer, automotive, medical and industrial devices.

## Features

- Operating systems supported: Embedded Linux, Green Hills INTEGRITY, DDC-I Deos™, Microsoft Windows, LynuxWorks LynxOS, QNX Neutrino, Wind River VxWorks, Linux
- Processors and System on Chip supported: Freescale PowerPC & i.MX, Renesas SH4, SH7xxx, Intel x86, IBM PowerPC, ARM, TI OMAP
- Graphics processors supported: ATI Radeon Mobility Radeon E4690 (M96), Radeon E4690, Radeon x1400 (M54), 9000 (M9); Fujitsu Coral PA, Carmine, Ruby; Various Intel, Texas Instruments, Freescale and other Imagination Technologies MBX, SGX platform
- Hardware accelerated support for OpenGL ES 1.1, OpenGL ES 2.0, OpenGL SC (Safety Critical), OpenGL 1.3, GLUT 3.7, GLU 1.3, GLX 1.3 and OpenVG 1.1
- Khronos EGL or ALT's "Mini-X" customized subset of X Windows that enables a user to run an application in multiple windows or to run a single window in full-screen mode
- X11 libraries for RTOS
- DMA and Programmed IO (PIO) support
- Variable sync modes and custom resolutions
- Multiple GPU support on single target systems
- RGB Analog, DVI, and LVDS outputs
- Full Video support including adjustable gamma, scaling, overlays and de-interlacing
- Hardware accelerated BitBlit, 2D and 3D operations for superior performance

## About ALT Software

ALT Software provides system level software products and development services that enable graphics, audio, video, and networking functionality in embedded devices. Our services include project management, device driver development, QA testing, and performance optimization. Our graphics kit family includes the GEK-178, a complete DO-178B Level A certifiable 2D / 3D graphics display driver and certification package for military and commercial aircraft cockpit display systems.



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## OpenGL ES 1.1 / SC Software GPU for systems with no or limited graphics processor

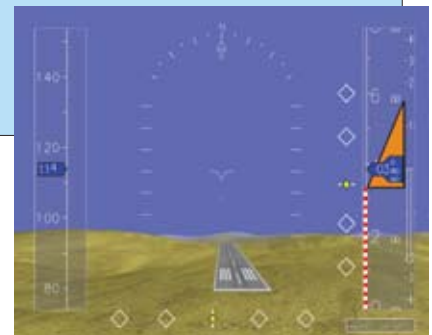
ALT Software OpenGL ES 1.1 / SC Software Renderer is a high performance, high quality software-based rendering solution that takes advantage of the processing power of the latest embedded processors for both general purpose and safety critical systems with a single, consistent API. Certifiable to DO-178B Level A, ALT's OpenGL ES Software Renderer is highly optimized and with its small footprint can be deployed in the most demanding computing environments.

## Customization Services

With over 15 years experience developing embedded graphics display drivers, ALT is a trusted provider of OpenGL graphics solutions for industry leading COTS hardware as well as RTOS vendors such as GE, Curtiss Wright Controls Embedded Computing, AITech Defense Systems, WindRiver, Green Hills Software, Lynuxworks and DDC-I.

## Modular Architecture

ALT's OpenGL drivers are designed with a modular architecture to minimize and isolate the coding changes required to move between target systems. This lessens the impact of developing for different platforms, operating systems, and graphics controllers. A common interface between the components simplifies integration and testing of custom modules and enhances the overall robustness of the driver.



## Reference Graphics Boards Supported

- GE Embedded Systems G2 Basic/Plus/ Dual
- AiTech M590/M591
- Curtiss Wright Controls Embedded Computing PMC 704/706
- Interface Concepts IC-GRA-PMC Carmine card
- Interface Concepts IC-GRA-XMC M54
- Intellics M54 XMC
- Intellics e4690 (M96) XMC
- Fujitsu Coral, Coral P/PA, Carmine Reference Board
- Fujitsu Carmine Reference Board
- Fujitsu Ruby Reference Board
- MI Electronics e4690 PMC
- Tech Source Condor 2000 e4690 (M96) XMC
- Wolf Industrial Systems M9 (9000) PMC, M54 (X1400) PMC/XMC, e4690 (M96) PMC/XMC

## Base Driver Features

- Support for OpenVG, OpenGL or OpenGL ES
- Support for GLUT 3.7, GLU 1.3, GLX 1.2
- Small footprint Mini-X Windowing API
- Direct mode rendering
- Supports both DMA and PIO
- Variable sync modes
- Resides in application space
- Texture size up to 4096 x 4096

## Graphics & Video Support

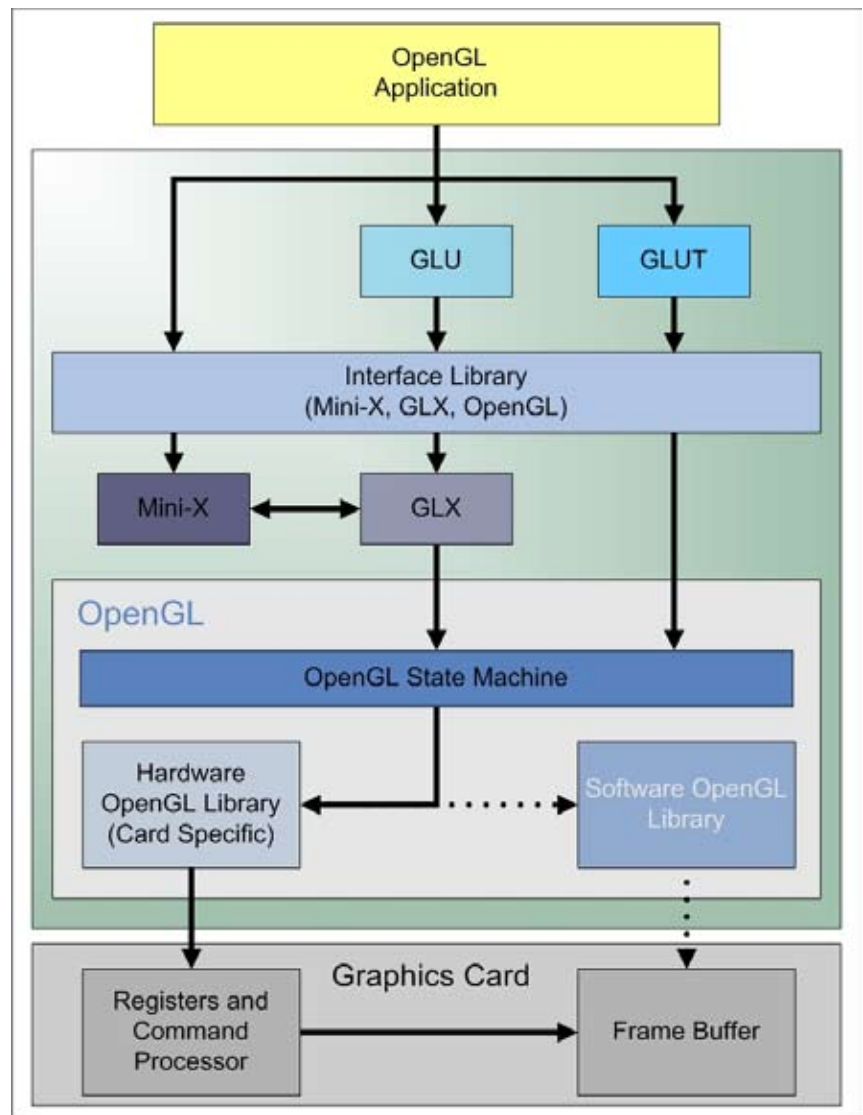
- Video as a texture or overlay
- Adjustable gamma
- De-interlacing support
- RGB Analog, DVI, LVDS, NTSC, PAL, STANAG 3350
- Custom resolutions up to 2048 x 1536
- 2 simultaneous and independent outputs per graphics controller

## 2D Acceleration Support

- bitBlt
- Line draw
- Polygon and rectangle fill
- Scissoring
- Raster operations
- Double buffering
- Hardware cursor

## 3D Feature Support

- Lighting effects
- Multiple clipping planes
- Geometry culling and clipping
- All 3D primitives
- Fog effects
- Alpha blending
- Point sample, bilinear and trilinear filtering
- Bump mapping



## Mini-X Windowing

ALT's general purpose OpenGL graphics drivers include Mini-X, a compact windowing API that allows a user to run an application within multiple Windows or to run a single Window in full screen mode. Mini-X is particularly suitable for deployment in limited-memory systems for which a full X-Server implementation is impractical.

## Memory Management for Limited-Memory Systems

Standard OpenGL assumes unlimited memory and a hard disk for virtual or pages memory support. ALT's OpenGL drivers provide optimized memory management functions that coordinate allocation between processes in limited-memory systems and systems with only physical memory.

