A graphical interface development package designed exclusively for real-time embedded systems. The tools you expect, the support you need, the quality and reliability your project demands.

PEG WindowBuilder™, shown at right, is a complete visual layout and design tool included with PEG+. The output of PEG WindowBuilder is EC++ source code, ready to be compiled and linked into your ROM or FLASH. PEG WindowBuilder is written entirely using the PEG+ library, allowing it to run on all Windows and Linux/X11 development hosts.

Custom user-supplied control types can easily be incorporated within the PEG WindowBuilder environment, allowing you to create completely unique screen designs using these WYSIWYG design tools. Custom graphics and fonts are also incorporated into your PEG WindowBuilder project, allowing you to do complete and accurate screen design using simple drag-and-drop techniques.
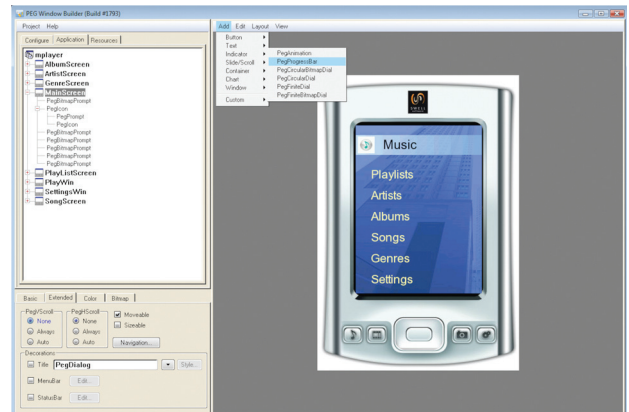
The default appearance of PEG+ windows and controls is similar to the appearance of a desktop windowing system. This appearance can, of course, be modified to create a completely custom look-and-feel. The window shown at right demonstrates the use of a custom title bar, custom button style, shadowed anti-aliased text and bitmap animation objects. PEG+ graphics can also be overlaid on real-time video or alpha blended using multiple software graphical layers. The library is easily configured for an infinite variety of display resolutions, orientations and color depths.

Anti-aliased fonts and anti-aliased line drawing are supported for high-color depth targets. Industry leading multi-lingual application support includes full Unicode and SJIS character encoding support, and string table editing and language pack generation facilities incorporated into the StringTableEditor as a part of the WindowBuilder resource manager.

The PEG+ Package
PEG+ includes a large set of basic control types such as various buttons, text gadgets and bitmap display objects. PEG+ also includes more advanced classes such as tree-view, spreadsheet and charting classes. In addition, PEG WindowBuilder provides an integrated resource manager which includes FontCapture for generating custom fonts and ImageConvert for converting PNG, JPG, GIF or BMP graphics into ROMable format supported by the PEG+ library. Advanced color reduction, dithering and optimal palette production can be applied to assist those running on greyscale, monochrome or limited palette targets. Rotated screen mounting is also seamlessly supported.
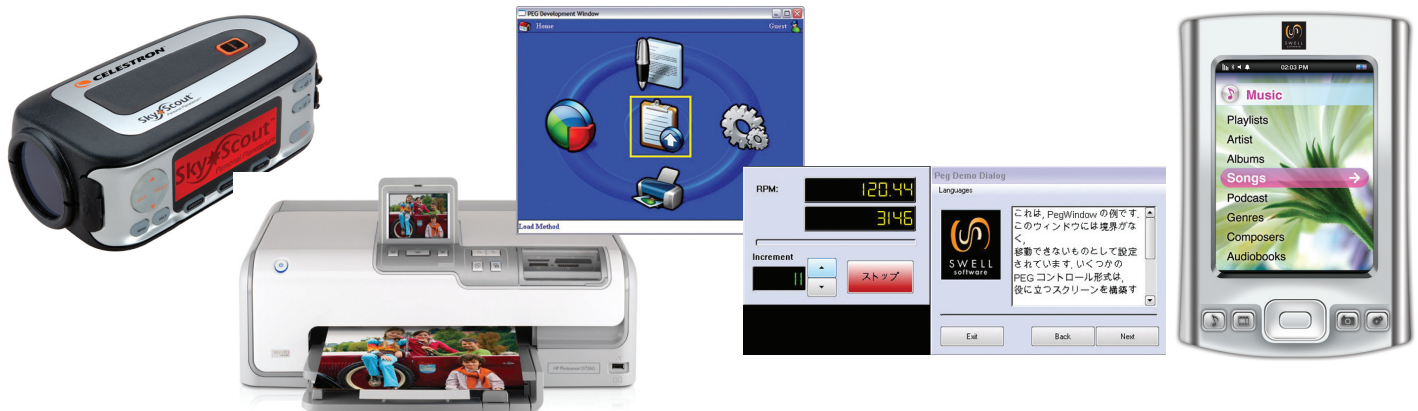
Summary

PEG+ provides the most complete GUI solution available to realtime emedded system developers. All of the utilities, documentation, support and development tools you will require for creating a graphical user interface on an embedded system are included with the PEG+ library development package.

Features

Reduced Size

PEG+ is written with the embedded market firmly in mind, meaning that the value of every feature is weighed against the code size and performance requirements of that feature. A minimum PEG+ footprint requires roughly 150K of code space, 4K of stack space and 8K of dynamic memory. A typical full-featured GUI requires a PEG+ footprint of roughly 170K code, 4K stack and 16K dynamic memory.

RTOS Integration

PEG+ is fully integrated with the RTOS messaging, memory management and synchronization services. This yields the lowest possible overhead and the only true real-time multitasking GUI environment available. PEG+ input devices are interrupt driven, and again use RTOS services to communicate user input information to the graphical user interface.

Multiple Tasks

PEG+ can also be configured to support multiple GUI tasks. These tasks can be of differing priorities and can each directly create, display and control any number of GUI windows or child controls. This advanced capability is unique to the design of PEG+.

Microsoft Windows Development

PEG+ provides a set of hardware and OS encapsulation classes which allow your PEG+ user interface to run as a standard 32-bit Windows application. You can create and test your entire user interface while using the very mature Windows application development tools. Moving to the final target requires only that you rebuild the PEG+ library and application software using your target specific tools.

X11 Development

PEG+ also provides an X11 Window System integration that allows your PEG+ application to run as a standard X11 application. Most major Unix platforms are supported including Linux, Lynx OS, NetBSD and Solaris. The PEG+ development tools are also X11 hosted, allowing you to do full application development and testing using this alternative host environment.

Compiler Support

The PEG+ library has been fully verified with all of the most popular embedded compilers including Green Hills MULTI, Metrowerks CodeWarrior, MetaWare, IAR, CAD-UI, ARM RealView, Borland, Microsoft, Hitachi, ST Microelectronics, Paradigm, Watcom, GCC, Tasking, TI Code Composer, Analog Devices Visual DSP, Microtec C/C++, and Keil µVision2.

Input Devices

PEG+ can be configured to support any combination of mouse, keyboard, touch screen or membrane keypad input.

Processor Support

PEG+ can be used with nearly any embedded CPU. A partial list of supported CPU types includes:
- All x86 designs including 8086, 80186, 80286, 80386, 80486, Pentium, Itanium, Athlon, Elan and other x86 derivatives.
- All 68K core designs including 68000, 68020, 68030, 68332
- Freescale DragonBall, i.MX1, i.MXL, i.MX21, i.MX31, PowerPC 823 and 860, MCF532x, MCF5227x, MCF547x/8x, and derivatives.
- Renesas H8, SH, SH2A and SH4 families
- MIPS R3000, R4000
- ARC cores
- All ARM cores including NXP LH Series, Cirrus Logic Maverick series and Samsung. Includes ARM7, ARM9, Thumb Mode support and MMU enabled designs. Internal or external LCD controllers.
- Infineon C166, C167
- Marvell PXA250, PXA255, PXA270, PXA320
- Analog Devices – Blackfin BF533, BF527, BF537, BF548, BF561
- Texas Instruments – OMAP 5912, OMAP 3530, OMAP 2430, DM270, DM320 DSP color (for RSA environment), DM355, DM6446
- Atmel AT91RM9200, AT91SAM9261, AT91SAM9263, AT91SAM9RL64
- Cirrus Logic 9307

Video Output

PEG screen drivers can be developed for virtually any processor/controller. The list below includes devices for which screen drivers currently exist. The PEG family of products support any orientation in resolutions (from 1 x 1 to 65535 x 65535) and, depending on the capabilities of the hardware, support a wide variety of color depths:

- C/PEG – monochrome to 16 bpp RGB color depths
- PEG+ – monochrome to 24 bpp RGB color depths
- PEG Pro – 16 bpp to 32 bpp RGB color depths

Commonly used/supported controllers include:
- Advanced Micro Devices – Geode GX1, Elan
- ATI – Rage Mobility, Mobility Radeon
- All ARM Cores – including ARM7/ARM9, Samsung (S6B7024), Thumb Mode
- Axell- AX51902
- Cirrus Logic – GD5430, 71110, 7212, 7312, 9307
- Epson – In Production - S1D13505, S1D13506, S1D13513, S1D13700, S1D13705, S1D13706, S1D13715, S1D13742/3, S1D13A04/S1D13A05
- Supported but discontinued per Epson - S1D13300, S1D13503, S1D13504, S1D1704, S1D13806, SPC8106 VGA LCD/CRT Controller
- Faraday – MB A320
- Fujitsu – Orchid, Scarlet
- 3Dlabs – Permedia II
- Linux – Linux Framebuffer Device
- Linux, Solaris, NetBSD, Lynx OS – X11 Windows
- Chips & Technology – CT545 Alpine, CT65550, CT69000/69030
- MediaQ – MQ200 & MQ400
- Noritake- GU256X128C-3900
- Philips – Trimedia
- NXP LH Series Controllers–LH79531, LH77790, LH79520 256 color
- LH79524, LH79525, LH75401, LH7A400, LH7A404
- Silicon Motion – Lynx 3DM (SM721), LynxEM+ (SM712), SM501
- ST Microelectronics – STV3550, STV3600, STD2000
- Topro – TP6508 controller
- X86 Standard VGA
- X86 VESA Extended Modes

Most screen drivers are developed upon request (at time of order), and may incur a nominal charge if one is not readily available in the Swell library for your particular application. Specific screen driver combinations comprise of PEG version, screen orientation, and color depth. Contact us at support@swellsoftware.com to see if a screen and/or touch driver for your particular application has already been developed.

Learn More

For more information on products from Swell Software, visit www.swellsoftware.com or write sales@swellsoftware.com.

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