

Exceptional speed  
in a small footprint



**HARLEQUIN**® embedded SDK™

Software solutions for embedded controllers

**v4**

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New in v4

- Now even faster
- High performance in even the smallest RAM footprint
- Now available for both single and multi-threaded implementations and 32 and 64-bit



**GLOBAL GRAPHICS**®  
software

# HARLEQUIN<sup>®</sup> embedded SDK<sup>™</sup>



Version 4 of the Harlequin Embedded SDK increases performance over previous versions providing manufacturers with exceptional speed in low memory operation for a wide range of embedded controller architectures and operating systems. It can run in with one or several threads with full control over core usage.

With its configurable support for PCL5 and XL, PostScript<sup>®</sup>, PDF and XPS, native PDL interpretation, compact and efficient software kernel, and sophisticated graphics and color handling routines, the Harlequin Embedded SDK is ideally suited to a vast array of devices, including MFPs and both monochrome and color printers and copiers.

The Harlequin Embedded SDK comprises high-quality components to give superior performance, quality and PDL fidelity. It is highly customizable allowing manufacturers to engineer competitive differentiation into their solution.

## CONFIGURABLE RIP CORE

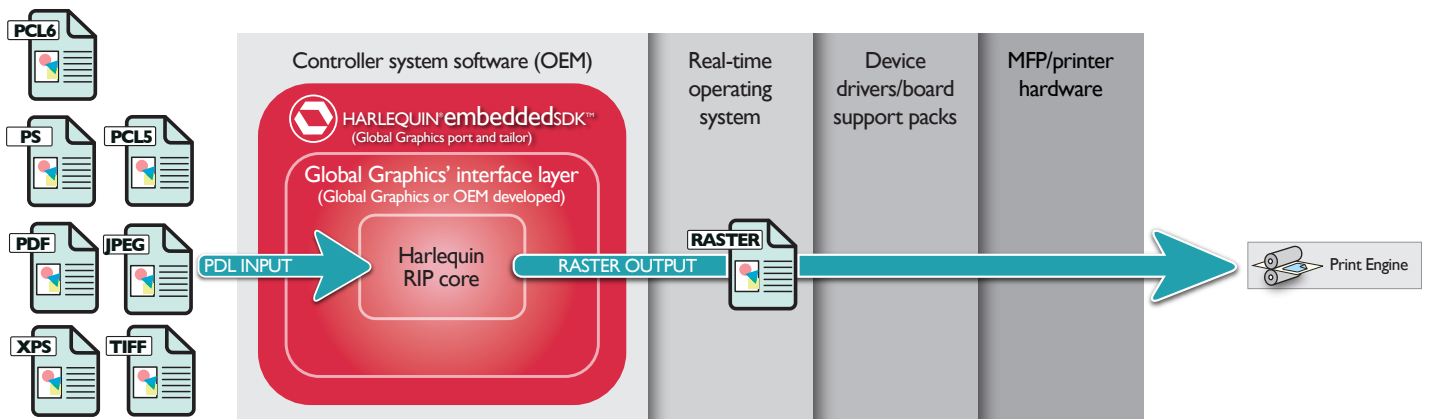
The Harlequin Embedded SDK provides printer/copier/MFP manufacturers with many key capabilities including:

- True native PDL interpretation - without conversion first to another format - for PostScript, PDF, PCL and XPS. OEMs may choose to take all, or any combination, of these PDLs and build them into a solution.
- Customisable and extensible PDL support
- Modular architecture enabling small footprint and low memory operation
- Highly flexible APIs facilitating easy integration of OEM or 3rd-party intellectual property including:
  - color management
  - font handling
  - screening /halftoning
  - compression/decompression

Global Graphics can provide all of these capabilities in the core product if required

- Extensive programmatic configuration language for
  - PDL interpretation (PCL, PostScript, PDF, XPS)
  - Direct image printing (JPEG, JFIF, TIFF, PNG)
  - Transparency support
  - Color management
  - Screening AM, FM, HDS (Harlequin Dispersed Screening), hybrid, dither, single and multi-level, custom
- Disk and diskless operation, with the ability to use a RAM-based file system if required
- Device resident font support
- Emulation of body text fonts in single-byte scripts, and facilities for font substitution
- Support for a wide variety of print resolutions, bit depths, color models and interleaving and frame raster format styles
- Cross-platform support.

## TYPICAL EMBEDDED SYSTEM SOFTWARE ARCHITECTURE



## EASY INTEGRATION

SDK code base designed for portability to common embedded processors and real time operating systems

Highly flexible APIs and extensive configuration options facilitate easy integration with OEMs' print controller/system software, allowing inclusion

of OEM intellectual property in the interpretation process and an optimized implementation for the specific target hardware.

## LOW COST

Runs in low memory environments, reducing the bill of materials for hardware. Well known as a very fast RIP; a faster RIP means lower hardware costs for the same print engine speed.

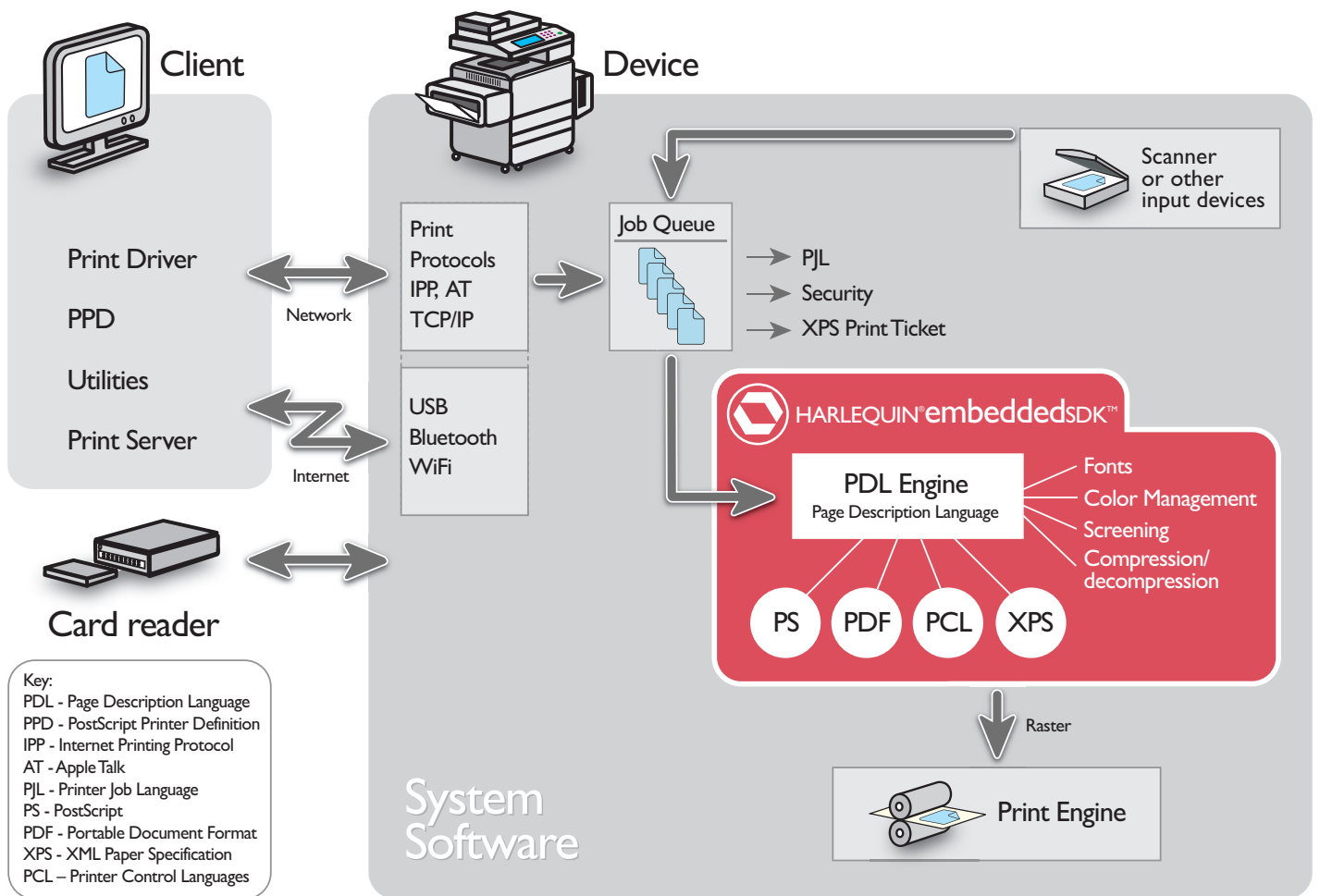
## LOW RISK

The Harlequin Embedded SDK assists peripheral manufacturers to deliver projects on time and on budget with the minimum of risk. We insulate our OEMs from PDL interpretation worries and provide support through an entire product lifecycle including product specification, design, integration and ongoing support with the product in the market.

## HOW WE WORK WITH YOU

OEMs can implement the software themselves utilizing comprehensive SDK documentation with support via Global Graphics' Technical Services team, or take advantage of Global Graphics' full integration service which gives access to our dedicated embedded development team who provide custom API deliverables that are specific to OEM requirements, as well as on-site integration support. We can also work with your selected integration partner, if required. New features can be added under NRE

## THE HARLEQUIN EMBEDDED SDK IN A TYPICAL CONTROLLER ENVIRONMENT



## HIGH PERFORMANCE

### HIGHLY TUNED CODE

The Harlequin Embedded Source code has been extensively manually tuned to maximise performance. Options to omit unnecessary raster delivery to reduce processing load after rendering.

### MULTI-THREADING

Compute intensive processes can be multi-threaded for speed.

## HARDWARE ACCELERATOR INTERFACE

The Harlequin Embedded SDK can offer customised interfaces that allow dedicated hardware to implement various functions such as Color Management and Screening, or full rendering capability derived from the intermediate Display List.

## FEATURES

Global Graphics' dedicated embedded development team is able to port to most embedded environments with typical feature support including, but not limited to, the following:

### Supported Environments

- Embedded Linux (ARM, PPC, Intel Atom)
- Monta Vista® (Linux®, x86, Intel Atom)
- ThreadX (ARM)
- VxWorks® (PPC, MIPS)
- Windows (x86, Intel Atom)
- Other platform support available on request, 32 bit & 64 bit variants supported.

### File Format Support

- PCL 5C, PCL 5E, PCL 6 (XL)
- PostScript Language Level 1, 2, 3
- PDF 1.0 - 1.7 and ISO 32000-1 support, including transparency and JBIG2/JPEG 2000 compression
- PDF 2.0 (ISO 32000-2:2017) support coming soon
- XPS 1.0, including native transparent rendering model to support XPS opacity, support for all XPS image formats including JPEG, PNG, TIFF and HD Photo; and extensible Print Ticket; and XML namespace support
- Direct image printing - TIFF, JFIF, JPEG and PNG.

### Fonts Options

#### Fonts Formats

- All font types required for PCL 5, PCL 6, PostScript, PDF and XPS
  - experienced with integrations of Monotype Imaging UFST (MicroType), Bitstream Font Fusion and FreeType
- Works with encrypted fonts from vendors such as Morisawa
- Emulation of missing fonts in single-byte Latin text
- Extensive font substitution capabilities
- **URW++ PS and PCL fonts can be included in your contract**

### Screening

- AM, FM, HDS (Harlequin Dispersed Screening)
- Single and multi-level
- Multiple methods of integration for 3rd-party or custom screening
- Threshold tables loaded direct from RAM, ROM or file
- Encryption options for screen caches

### Graphics Support

- Separated/composite output: DeviceGray, DeviceRGB, Device CMYK, DeviceN etc color spaces
- Bit Depth: 1, 2, 4, 8, 16
- Raster delivery in pixel, band, frame, separation, etc

### Color Management

All color requirements for PCL, PostScript, PDF and XPS supported (including PostScript CRDs)

#### ICC profile support including:

- ICC v2 and v4
- Grey, RGB, CMYK and N-color profile support
- DeviceLink profile support, e.g. for direct CMYK-to-CMYK color transformations
- Black point compensation
- Look-up tables for accurate spot color emulation
- API to integrate other Color Management Systems
- Global color correction in LAB space
- Emulation - allows for RGB-LAB-CMYK

### Memory Requirements

- Code size: ranges from 3.5MB for single PDL (Postscript or PCL) to 8.5MB for all 6 PDLs –This excludes resources and is based on a windows build. Embedded targets are generally larger, dependent on processor and compiler
- Working RAM is a minimum of 12MB for PostScript and PCL with a typical range of 45M to 128MB for additional PDLs
- Resources are typically 4MB for PostScript and up to 25MB (uncompressed) for all 6 PDLs. These are configurable depending on resources such as fonts, and are normally compressed and built into for Embedded platform builds

## WORK WITH THE EXPERTS!

### OUR CUSTOMERS CHOOSE US BECAUSE:

- Our software is **technically superior** and **performs faster** than our competitors
- We are **software innovators**
- We have a **flexible and open** commercial model
- We are easy to work with because we have a **partnership approach** to development
- We offer **superb technical support**
- We can be your **single source** for both PDLs and fonts

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