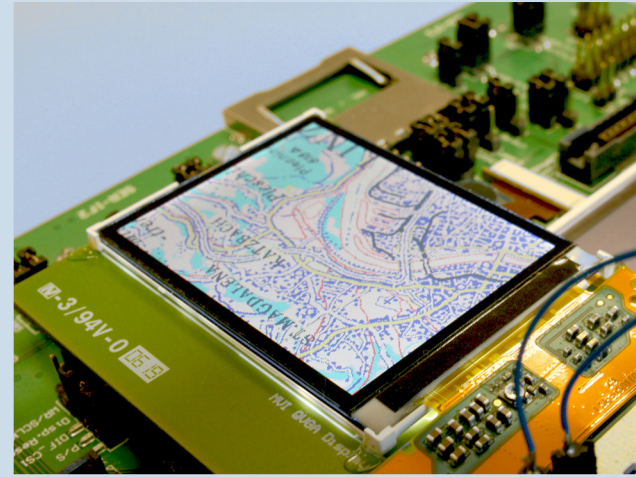


gRacr

Graphics Accelerator & Display Controller
[DIP.GR.040]



Introduction

Modern, visually compelling graphical user interfaces as known from the PC world, are now finding their way into embedded and mobile devices. In order to provide a highly sophisticated user experience, while not compromising overall system performance or power consumption, hardware acceleration for GUI rendering has become indispensable.

gRacr 040 is the toolkit to provide this acceleration. From simple effects like semi-transparent overlays to complex, GUIs based on 3D objects, gRacr 040 can be configured to accelerate the primitives which are computationally most demanding, while leaving out everything that is not needed for the specific application. This configurability ensures both minimal area footprint as well as minimal power consumption.



gRacr 040 Interfaces

Input Interfaces

- ITU-R BT.656
- ITU-R BT.601
- Compressed (JPEG) Input

Output Interfaces

- MIPI DSI
- MIPI DPI up to 24 bit wide
- MIPI DBI 8 / 9 bit wide
- Legacy Serial (up to 26 mbps)
- MVI™
- PAL / NTSC composite / s-video
- Secondary display support
- Bufferless display support

Bus Interfaces

- Slave control interface
- Master camera input interface (if camera interface required)
- Master display update interface (if display interface required)
- Master processing interface (if graphics acceleration required)

All bus interfaces are AHB AMBA 2.0 compatible

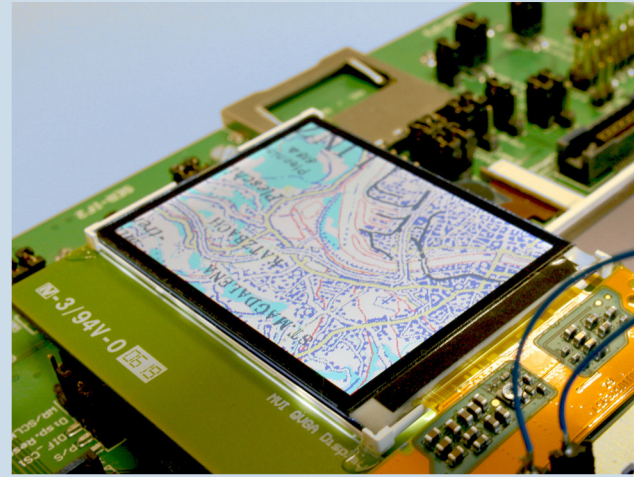
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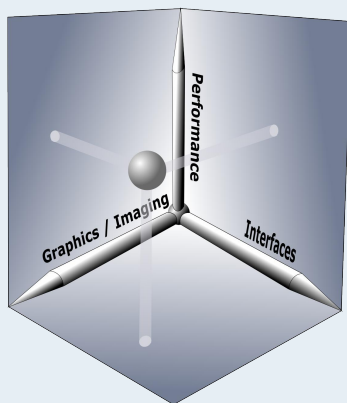


gRacr 040, a one-stop shop for embedded graphics

gRacr 040 not only accelerates the graphics rendering process, but also handles its output to a variety of display devices. Whether a low end secondary display, a high resolution MIPI™ DSI based display or even a conventional TV-set with composite input jack serves as the graphic pipeline's data sink, gRacr 040 provides the adequate video signal. On the input side gRacr 040's lightweight camera interface serves as a means to input data from a wide range of camera sensors.

Get the gRacr 040 you need

Every application has its own requirements in terms of connectivity, performance and feature set. Since we do not believe in the one-fits-all philosophy as seen with most other solutions in the embedded graphics field, we designed gRacr 040 to be configurable at a very fine grained level. This ensures that it can be customised to your very needs, resulting in a slim solution without bells and whistles.



Find your own location in the gRacr 040 configuration space: Choose from different Interfaces, Graphics or Imaging Features and decide how much performance you will need to meet your requirements.

gRacr 040 Graphics and Imaging Features

Update and Framebuffer

- framebuffer up to 1023x1023 Pixels
- different 16/18/24 and 32 bit colour formats
- 8 Bit alpha blended full frame overlay
- up to 8 alphablended sprites (hw cursor)
- autonomous display update
- full / partial update

Imaging Functions

- Programmable colour conversion matrix (e.g. YUV2RGB)
- Rotation (in steps of 90°) and mirroring
- Bilinear Scaling (with arbitrary scaling factor)

Graphics Acceleration

- Bresenham line (stippling, antialiasing)
- Fast rectangle fill
- BitBlt (incl. colour expansion, font antialiasing, alphablending)
- Triangle rasterisation with
 - Antialiasing
 - Flat and gouraud shading
 - Texturing
- Alpha blending
- Z Buffering

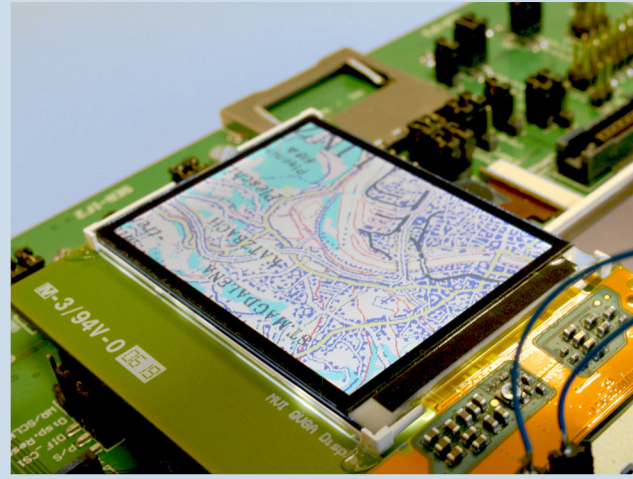
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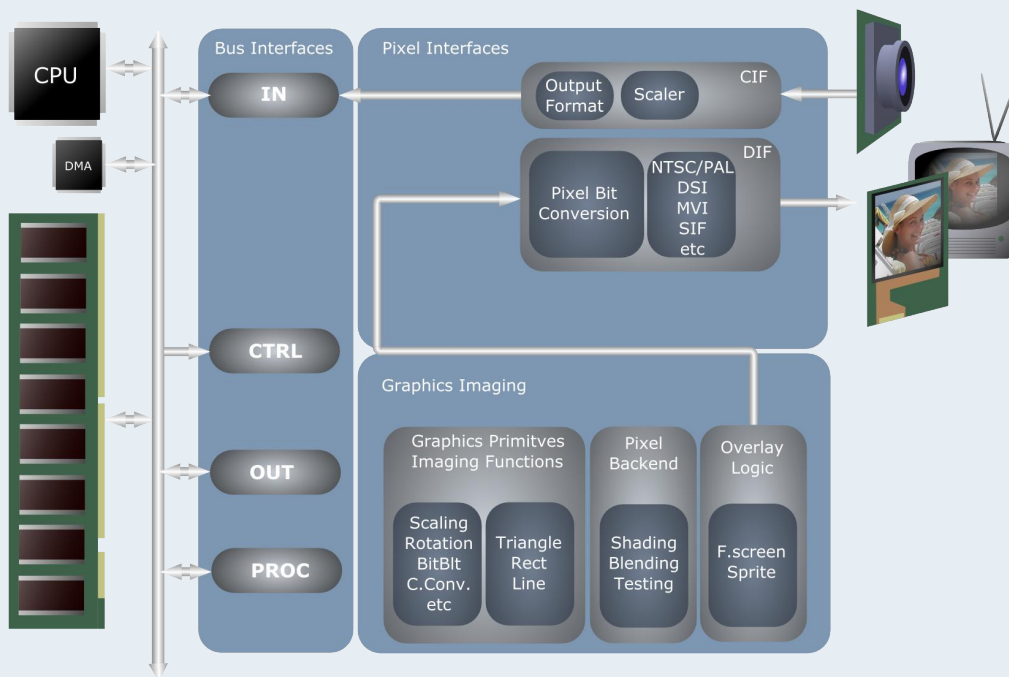


gRacr 040 Feature Set

gRacr 040s feature set comprises a number of interfaces as well as graphics and imaging features which can be combined to any reasonable configuration.

gRacr 040 Architecture

The following diagram depicts a top level view on gRacr 040s basic architecture . A sample system would comprise a CPU, a RAM that holds frame buffer and image data as well as several input and output devices . For plain display update the CPU rests completely idle and can be shut down.



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