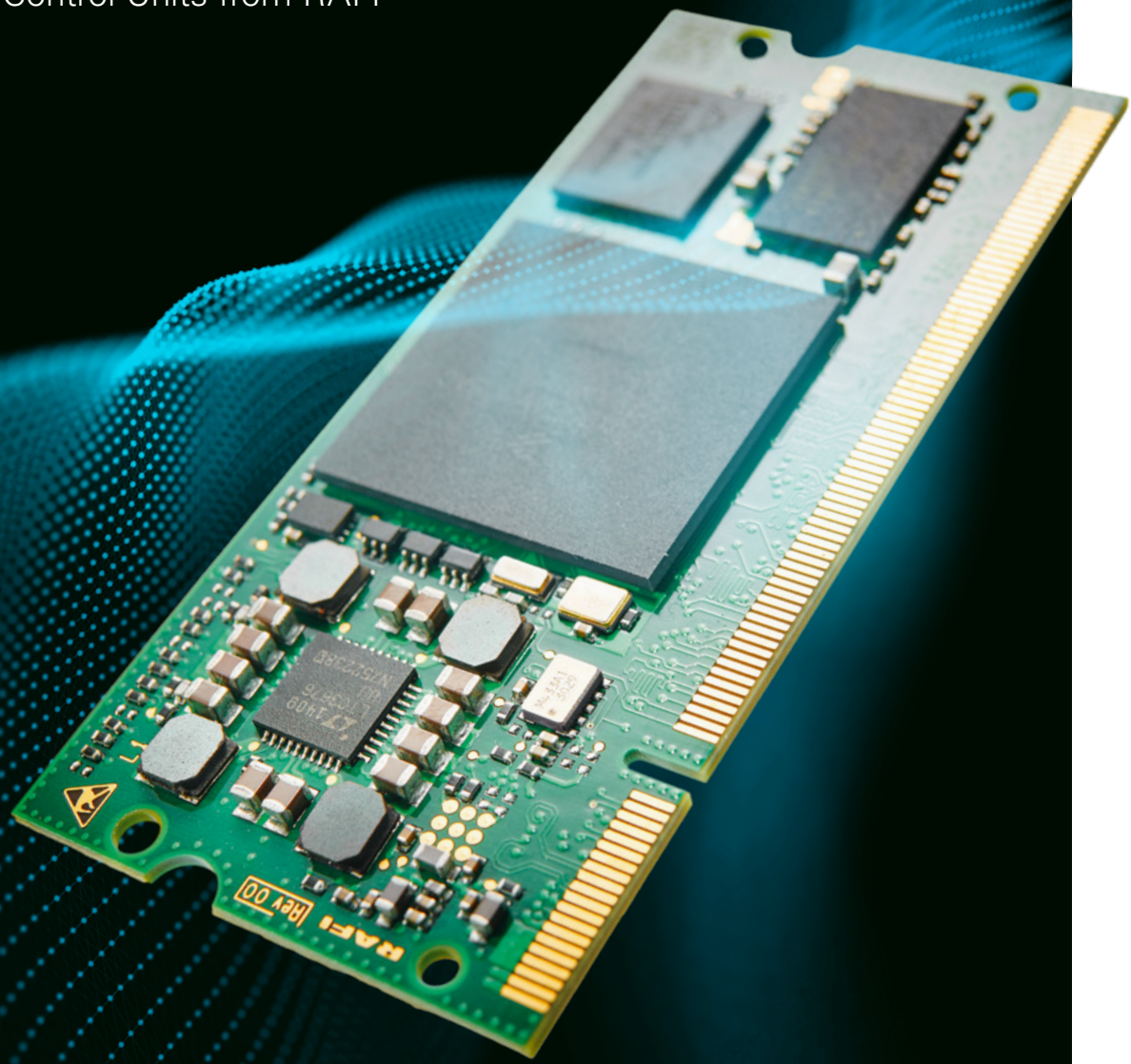
ECU

Embedded Control Units from RAFI



www.rafi.de

RAFI

RAFI ECU AT A GLANCE

Depending on customer requirements, we equip our GLASSCAPE touch displays and control panels with complete processor units. These Embedded Control Units (ECU) take care of control and visualization tasks. From **RAFI** you get your customized control solution comprising touch technology, housing, processor, and drivers from a single source.

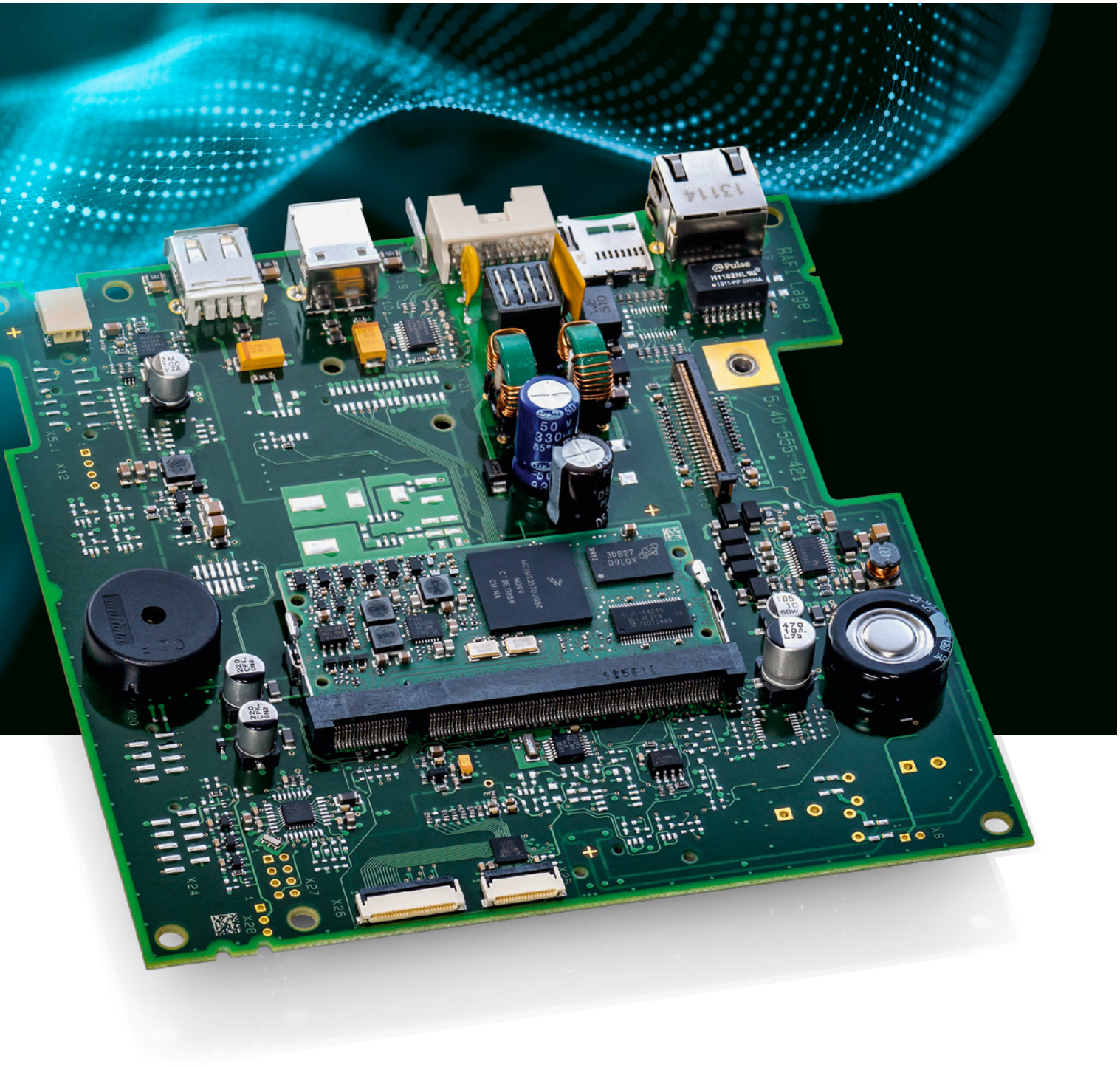
For many years, leading companies in various industries have been counting on **RAFI**.

HMI and controls for a coffee machine

Mobile HMI for industrial robots

iTerminal for the Pistenbully

HMI for breathing apparatus



YOUR ADVANTAGES

- Three power classes
- Single-board computers as plug-in modules
- Pin-compatible connector system
- Low power draw and fan-less design
- Fast and flexible adjustment to customer-specific design
- Continuous platform development and servicing
- Low development costs
- Long-term availability due to own production

ECOECU

Processor unit for simple control and imaging tasks. Our customized, integrated solutions optimize unit costs. We use cost-effective 8, 16, and 32-bit controllers with and without operating systems.

BALANCEECU

Plug-in module for medium control tasks, HMI with animated images and single touch – not recommended for 3D applications. Fast and flexible adjustment to your demands using modular solutions. The Balance ECU module is available with Win CE 6.

POWERECU

Plug-in module for challenging control tasks, HMI with Full-HD video playback and multi-touch. Fast and flexible adjustment to your demands using the platform base board. The Power ECU module is available with embedded Linux and Win EC 2013.

THE RIGHT UNIT FOR YOUR PROJECT

→ RAFI ECU			
			
	Touch	Multi-Touch	-
Graphic	max. resolution	800 x 600; 24 BPP	-
	Interface	Parallel 24-bit RGB	-
	Special features	OpenVG™ 1.1 2D (GC355)	-
Controller	Core	ARM Cortex-A5 + Cortex M4	ARM Coretex-M3/M4
	Type	NXP Vybrid	STM32F2 / F4
	Clock rate	450 MHz (A5), 166 MHz (M4)	up to 180 MHz
Memory	RAM	up to 2 MB internal; 256 MB DDR3	up to 384 kByte internal
	Flash	128 MB NAND-flash	up to2 MByte internal
	EEPROM	32 KB	-
Real-time clock	Type	NXP PCF2123	-
Temperature range	Operation	0 °C ...+70 °C (optional -40 °C...+85 °C)	-40 °C...+85 °C (optional -40 °C...+105 °C)
Interfaces	Ethernet	2 10/100 Mbps incl. Phy	1 10/100 Mbps incl. Phy
	USB	2 USB 2.0 High-Speed (480 Mbps) OTG incl. Phy	1 USB 2.0 High-Speed (480 Mbps) OTG incl. Phy 1 USB 2.0 Full-Speed (12 Mbps) Host incl. Phy
	CAN	up to 2 CAN	up to 2 CAN
	UART	up to 6 UART	up to 4 UART
	I2C	up to 4 I2C	up to 3 I2C
	SPI	up to 4 SPI and up to 2 QSPI	up to 3 SPI
	Audio	I2S + ESAI + SPDIF	-
	Camera	up to 4 analog camera inputs (not simultaneous)	-
	SD/MMC	up to 2 SD/MMC	1 x SDIO
Analog / digital converter		ADC: up to 16 channels @ 12 bit DAC: up to 2 channels @ 12 bit	ADC: up to 24 channels @ 12 bit DAC: up to 3 channels @ 12 bit
Plug system		integrated solution	integrated solution
Dimensions		integrated solution	integrated solution
Operating system		MQX 4.1.2	-
Visualization		EBGuide	-

BALANCE ECU	BALANCE ECU CUSTOMIZED	BALANCE ECU CUSTOMIZED	POWER ECU
Single-Touch	Multi-Touch	Multi-Touch	Multi-Touch
1024 x 1024; 24 BPP	1920 x 1200; 24 BPP	2048 x 2048; 24 BPP	1920 x 1200; 24 BPP
Parallel 24-bit RGB	Parallel 24-bit RGB Dual LVDS optional	Parallel 24-bit RGB	Parallel 24-bit RGB Dual LVDS optional
OpenVG™ 1.1 2D	OpenGL® ES 2.0 3D OpenVG™ 1.1 2D	PowerVR SGX530 3D graphics engine	OpenGL® ES 2.0 3D OpenVG™ 1.1 2D
ARM1136JF-S	ARM Cortex-A9 / ARM Cortex-M4	ARM Cortex-A8	ARM Cortex-A9
NXP i.MX357	NXP i.MX6SX	TI Sitara AM3354	NXP i.MX6S6AVM08AC
532 MHz	800 MHz	600 MHz	800 MHz
256 MB LPDDR mobile	1 GB DDR3 SDRAM	512 MB DDR3	1 GB DDR3 SDRAM
512 MB NAND-Flash	1 GB NAND-Flash and/or 8 GB eMMC	4 GB eMMC	1 GB NAND-flash
4 KB	4 KB	4 KB	4 KB
NXP PCF8523	MCS RV-3029-C3 (temperature compensated)	Possible	MCS RV-3029-C3 (temperature compensated)
0 °C…+70 °C (optional -40 °C…+85 °C)	-40 °C…+85 °C	-0 °C…70 °C (storage -20 °C…+85 °C)	-40 °C…+85 °C
1 x 10/100 Mbps (IEEE1588) incl. Phy	up to 2 1 Gb Ethernet + IEEE1588 + AVB	2 10/100 Mbps/1 GBps (IEEE1588) without Phy	1 10/100 Mbps (IEEE1588) incl. Phy
1 USB 2.0 High-Speed (480 Mbps) OTG incl. Phy 1 USB 2.0 Full-Speed (12 Mbps) Host incl. Phy	1 USB 2.0 High-Speed (480 Mbps) OTG incl. Phy 1 USB 2.0 High-Speed (480 Mbps) Host incl. Phy	2 USB 2.0 High-Speed (480 Mbps) Dual-Role incl. Phy	1 USB 2.0 High-Speed (480 Mbps) OTG incl. Phy 1 USB 2.0 High-Speed (480 Mbps) Host incl. Phy
up to 2 CAN	up to 2 CAN	up to 2 CAN	up to 2 CAN
up to 3 UART	up to 5 x UART	up to 6 UART	up to 3 UART
up to 3 x I2C	up to 3 I2C	up to 3 I2C	up to 3 I2C
up to 2 SPI	up to 4 SPI	up to 2 SPI	up to 4 SPI
1 audio	2 serial audio	No	2 serial audio
-	1 20-bit parallel	No	2 cameras
up to 2 SD/MMC	up to 2 SD/MMC	up to 3 x SD/MMC	up to 2 SD/MMC
No	2 4-channel, 12-bit ADC	Yes / 8 channels @ 12 bit	No
1 200-pin SO-DIMM (baseboard contacting TYCO(AMP) 1717254-1)	integrated solution	integrated solution	1 200-pin SO-DIMM (baseboard contacting TYCO(AMP) 1717254-1)
67.6 mm x 31.0 mm	integrated solution	integrated solution	67.6 mm x 31.0 mm
WinCE 6.0	Linux Kernel 4.1.2 Yocto 2.3 Pyro	Linux Kernel 4.1.18 Yocto 2.1 Krogoth	Windows Embedded Compact 2013, Linux Kernel 4.1.15, Yocto 2.0 Jethro
Qt	-	Qt v5.6.3 / Native FrameBuffer	Qt v5.5.1 / Native FrameBuffer GTK / EB GUIDE on request

EVALUATION KIT

YOUR SYSTEM DEVELOPMENT

With the Evaluation Kit for the **POWER**[ECU], you get a fully functioning system development package for testing your application or fast design of prototypes.

The outside of the Evaluation Kit features all current interfaces for simple connection. The Evaluation Kit is supplied with embedded LINUX, a Qt demo application as well as a virtual machine with SDK and Qt Creator.

Processor
i.MX 6Solo

Display
12,1“ PCAP touch and TFT display

Resolution
1280 x 800

Interfaces
USB, serial, CAN, Ethernet etc.

Operating system
Embedded LINUX

Scope of delivery
- Qt demo application
- Virtual Machine with SDK and Qt Creator
- User Manual
- LINUX Reference Guide

POWER LINUX BSP

EASY AND COST-EFFECTIVE

PowerLINUX is the Board Support Package (BSP) for POWER[ECU]. The high integration of interface drivers, functions, and graphics performance makes implementation of your application easy and cost-effective.

SYSTEM

Kernel
4.1.15_1.2.0

Bootloader
Barebox 2017.01.0

Distribution
Yocto Jethro 2.0.3

File system
UBIFS

Init system
systemd

GRAPHIC

Graphic library
OpenVG 1.1 / OpenGL ES 3.0 / EGL 1.4

Window system
Wayland display protocol with Weston compositor

GUI framework
Qt v5.5.1 / Native FrameBuffer
GTK / EB GUIDE on request

LICENSES

GNU General Public License (GPL)
Version 3, June 2007
Version 2, June 1991

GNU Lesser General Public License (LGPL)
Version 3, June 2007
Version 2.1, February 1999
Version 2, June 1991

Depending on the scope of delivery, further licenses may be affected.

DRIVERS AND INTERFACES

Memories
NAND flash / SPI-NOR flash / EEPROM / SD card / USB mass storage

Input devices
Mouse, keyboard, RAFI-Touch (PCAP)

WLAN / Bluetooth
On request

FUNCTIONS AND SERVICES

Consoles
Serial console / network console

Shell
Bash

Connectivity
OpenSSH (client & server) / SFTP

Audio
PulseAudio / ALSA (Advanced Linux Sound Architecture)

Video
V4L (Video for Linux) with H.264 video decoding (HW-accelerated)

Package Manager
dpkg (Debian Package Manager)

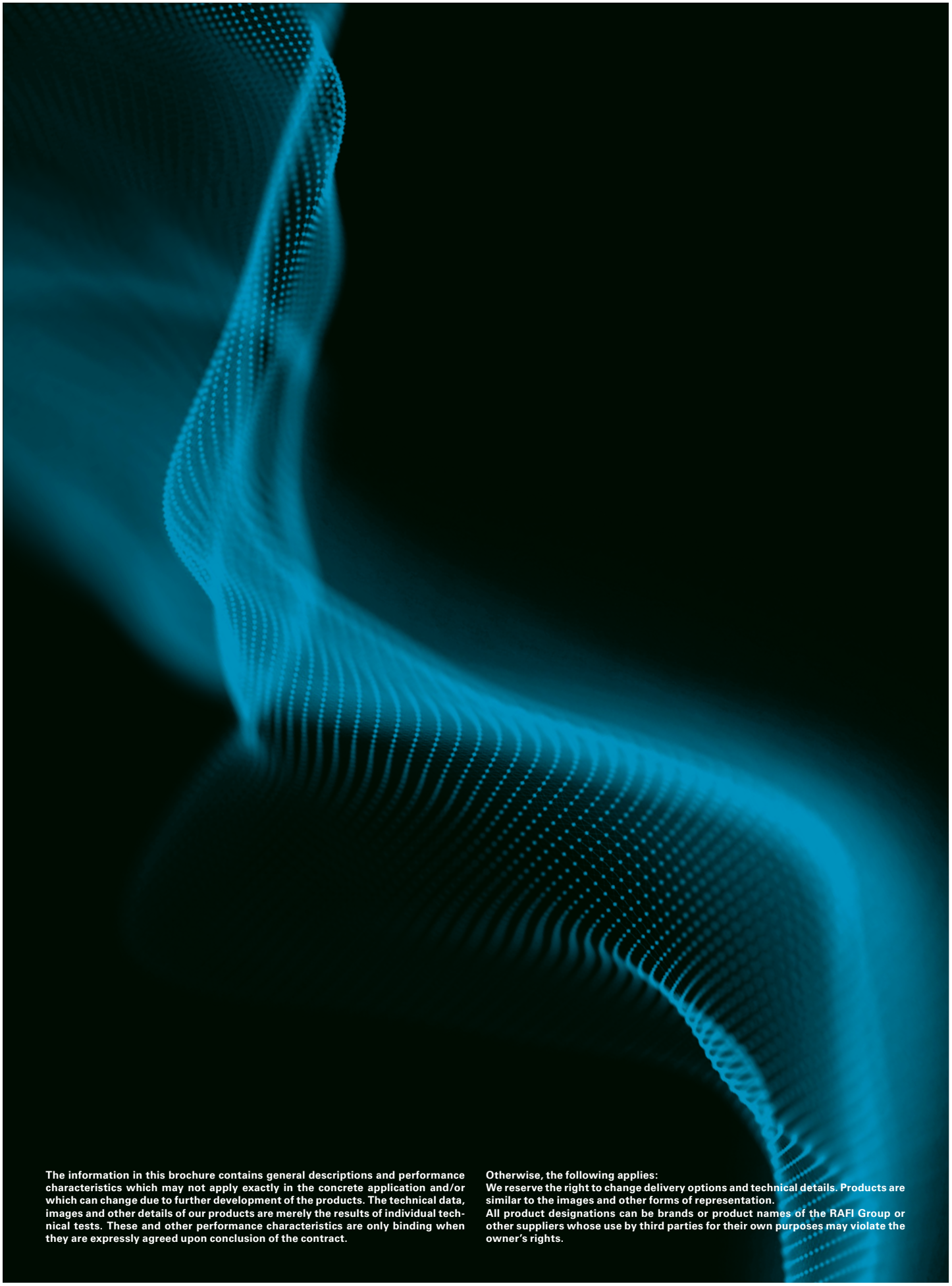
Webserver
Apache2 with PHP5 support / Lighttpd on request

Database
MariaDB v5.5.46 (formerly MySQL)

Script support
Python v2.7.9 / v3.4.3 / Perl on request

Splashscreen
Adaptable

Image update
Kernel, Bootloader, RootFS, Splashscreen



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