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STM32 for graphics

Accelerating the HMI of Things

STM32

The evolution of embedded HMIs

Smarter user interfaces for smarter products

The user experience provided by smartphones sets a new standard for smart devices

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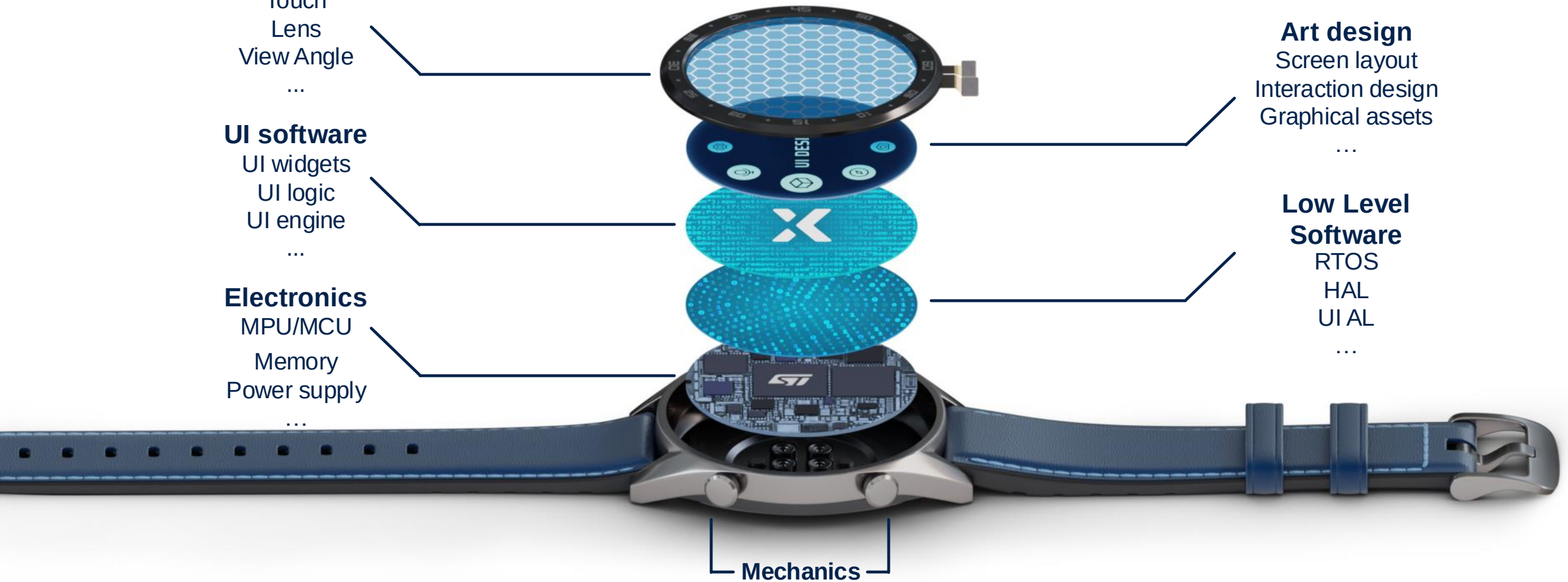
What it takes to develop GUIs

Display
Touch
Lens
View Angle
...

UI software
UI widgets
UI logic
UI engine
...

Electronics
MPU/MCU
Memory
Power supply
…



Art design
Screen layout
Interaction design
Graphical assets
…

Low Level Software
RTOS
HAL
UI AL
…

Mechanics
Casing
Plugs
Buttons
…

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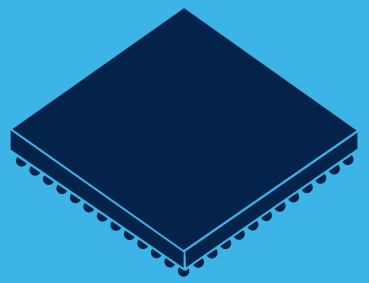
STM32 graphics offer



STM32 hardware

TouchGFX

Full support for MCU

MPU add-on available

\+

Third-party librairies

STM32 software

Authorized Partner

Extensive ecosystem

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STM32 hardware
MCU/MPU for any UI needs

GUI Performance

Smartphone- like

Entry level

STM32G0
STM32C0
STM32WB
STM32U0

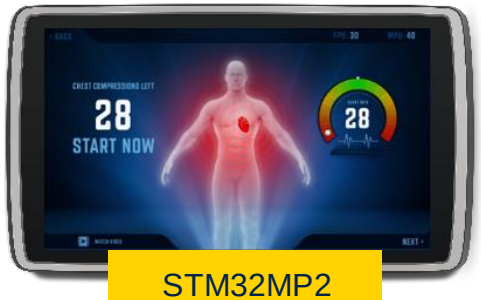
STM32H5

STM32U5

STM32H7

STM32N6

STM32MP1



STM32MP2

CPU Performance

Cortex®-M0+ Cortex®-M33 Cortex®-M7 Cortex®-M55 Cortex®-A7 Cortex®-A35

STM32 MCU
embedded graphics hardware acceleration

Watch demo

Chrom-ART Accelerator

- Offloads the CPU from repetitive graphics tasks
- Fluid motion and transparency effects with 80% less CPU resources

Chrom-GRC

Graphic resource cutter for non-square displays, saving up to 20% of the framebuffer's RAM needs

JPEG hardware accelerator

- JPEG compression and decompression
- Minimizing CPU load
- Enables play of high-quality motion JPEG videos

NeoChrom GPU accelerator

- 2.5D acceleration for scaling and rotation effects
- New graphic processing unit to optimize animation: accelerates texture mapping and alpha blending

STM32N6 Graphics accelerators
NeoChrom GPU

NeoChrom GPU

NeoChrom GPU benefits:

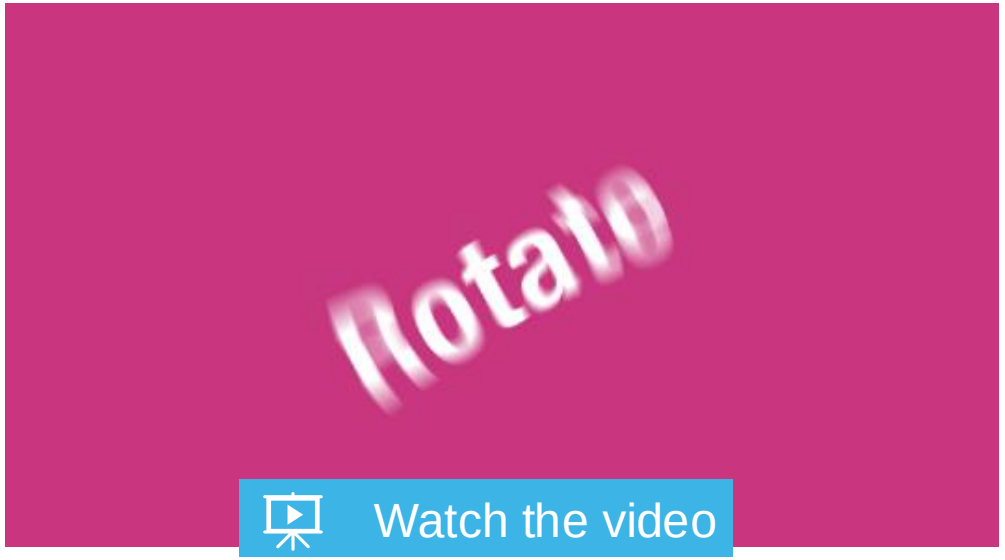
- Offload CPU from graphical operations
- Lower memory consumption and access
- Higher GUI performance = 60 FPS
- 2.5D GUI effects

New graphical operations supported by NeoChrom GPU

2D features
Simple Drawing
2D Copy
Alpha blending
Color format conversion

&

Advanced GUI Features
Advanced Drawing
Scaling and Rotation
Perspective correct texture mapping
Image format compression



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NeoChrom GPU

Vector graphics

Vector graphics with NeoChromVG GPU

Scalable vector graphics (SVG)

- To reach nice dynamic effects
- To save flash memory

Fonts

- Drawing and manipulating characters and text-strings
- To enable dynamic graphics effects
- To save flash memory

Map

Vector graphics are required to make map navigation possible (significant and dynamic maps, zooming)

Read the blog

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STM32 MPU
embedded graphics hardware acceleration

Arm® Neon™ Technology
Improves the multimedia user experience by accelerating audio and video encoding/decoding, user interface, 2D/3D graphics or gaming.

VeriSilicon GPU Vivante
Providing the performance and efficiency needed for modern devices and systems with support for industry-standard APIs and advanced features.

VeriSilicon VPU Hantro
Microprocessor IP for video codecs and video processing, with outstanding capabilities in supporting mainstream video formats and much more.

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STM32 software leveraging STM32 hardware capabilities

TouchGFX, the free software tools for creating stunning user interfaces on STM32

TouchGFX DESIGNER

PC GUI-builder and -simulator

TouchGFX GENERATOR

Configure and generate a TouchGFX project

TouchGFX ENGINE

Optimized and hardware accelerated graphics library

Delivered as an X-CUBE-TOUCHGFX package

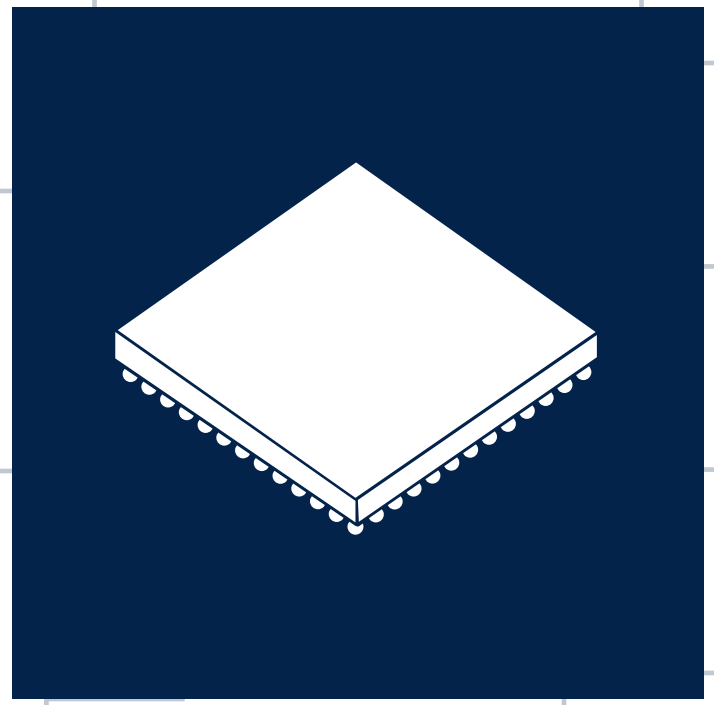
Libraries running with the STM32 MPU ecosystem

GTK - GIMP ToolkitFree and open-source
- C and many other languages
- Set of widgets ready to use
- OpenSTlinux support (Yocto and Buildroot)

- Free and open-source (Android open-source project)
- Variety of graphics rendering APIs for 2D and 3D
- Android support

QT
- Set of widgets ready to use
- C++ and many other languages
- Supported on many platforms
- OpenSTlinux support (Yocto and Buildroot)

LVGL - Light and Versatile graphics Library
- Free and open source
- C language
- Set of widgets ready to use
- OpenSTlinux support (Yocto and Buildroot)
- Bare metal support



- WYSIWYG tools
- Drag and drop interface

Embedded Wizard

- WYSIWYG tools
- Drag and drop interface

CRANK SOFTWARE

- WYSIWYG tools
- Drag and drop interface

CANDERA

- WYSIWYG GUI editor
- Can be scaled to a variety of STM32

altia

- Works with LVGL or GTK libraries
- Programming language needed

slint

- WYSIWYG GUI editor
- Perfect fit for all STM32

TouchGFX

STM32 MCU graphics examples of achievable UI performance

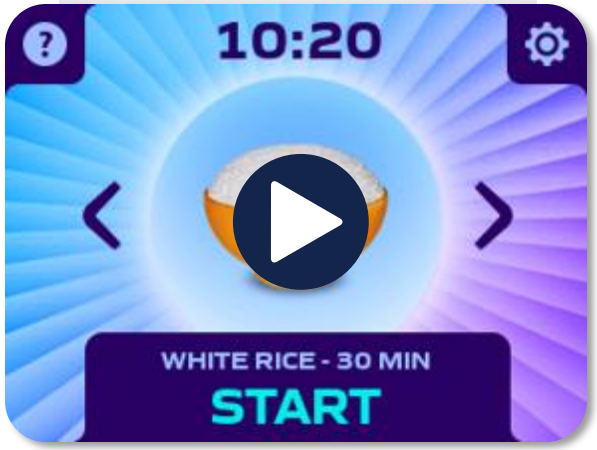
STM32C0

+

TouchGFX

Display resolution
up to 320 x 240

Entry level - internal RAM



High level - internal RAM

STM32U5

+

TouchGFX

Display resolution
up to 1024 x 768

STM32H5

+

TouchGFX

Display resolution
up to 640 x 480

Mid level – internal RAM

High level - external RAM

STM32H7

+

TouchGFX

Display resolution
up to 1280 x 800

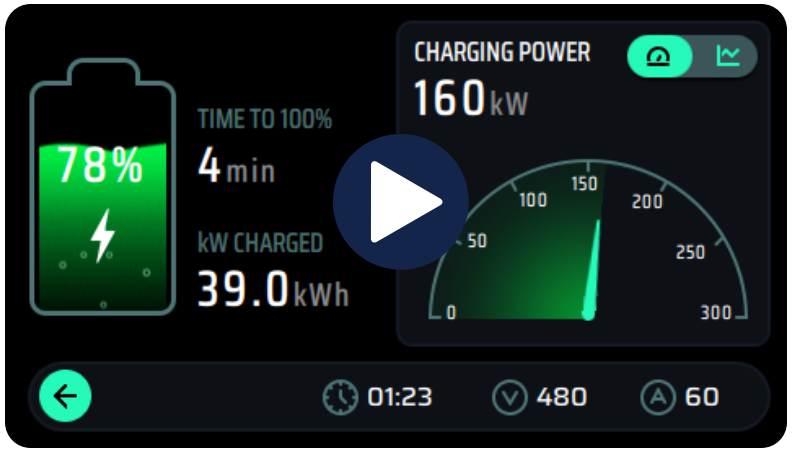
STM32 MPU graphics examples of achievable UI performance

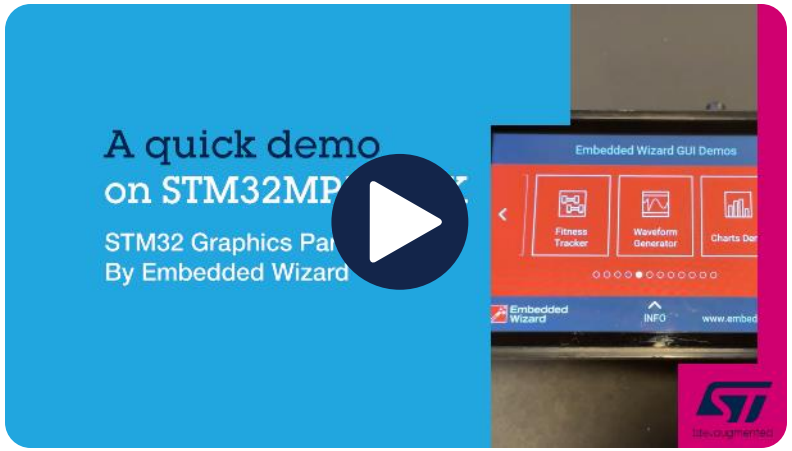
STM32MP135

\+

Qt

Display resolution
up to 480 x 272





STM32MP157

\+

Embedded Wizard

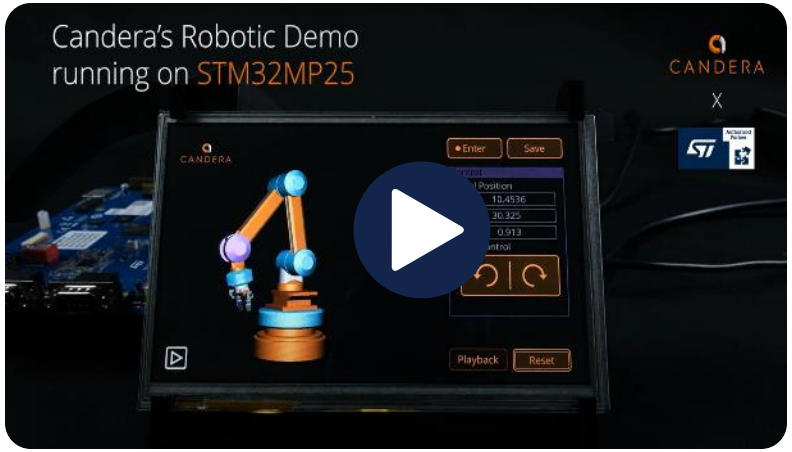
Display resolution
up to 480 x 800
MIPI DSI®

STM32MP157

\+

CANDERA

Display resolution
up to 480 x 800
MIPI DSI®



STM32MP25

\+

CANDERA

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Take your UI design to the next level free stock library in TouchGFXDesigner

TouchGFX Stock, the largest library of graphical assets, free for STM32 MCUs

TouchGFX stock

Find everything you need to create a consistent, professional-looking UI.

Ready-to-use themes, backgrounds, and visuals.

Watch the video

All graphical designs, images, and icons provided in TouchGFX Stock, are free to use in commercial projects using microcontroller and/or microprocessor devices manufactured by or for STMicroelectronics.

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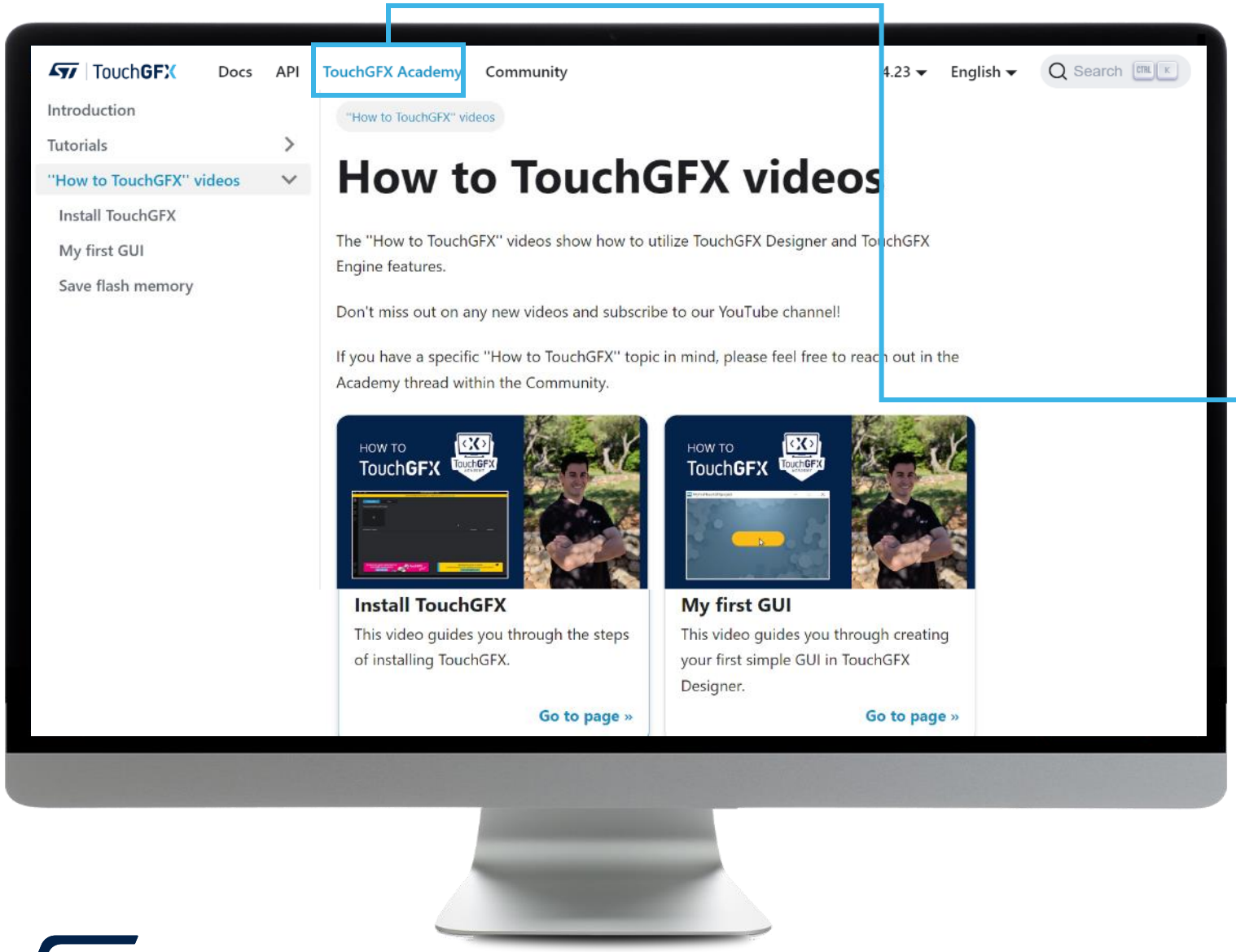
TouchGFX Academy



NEW

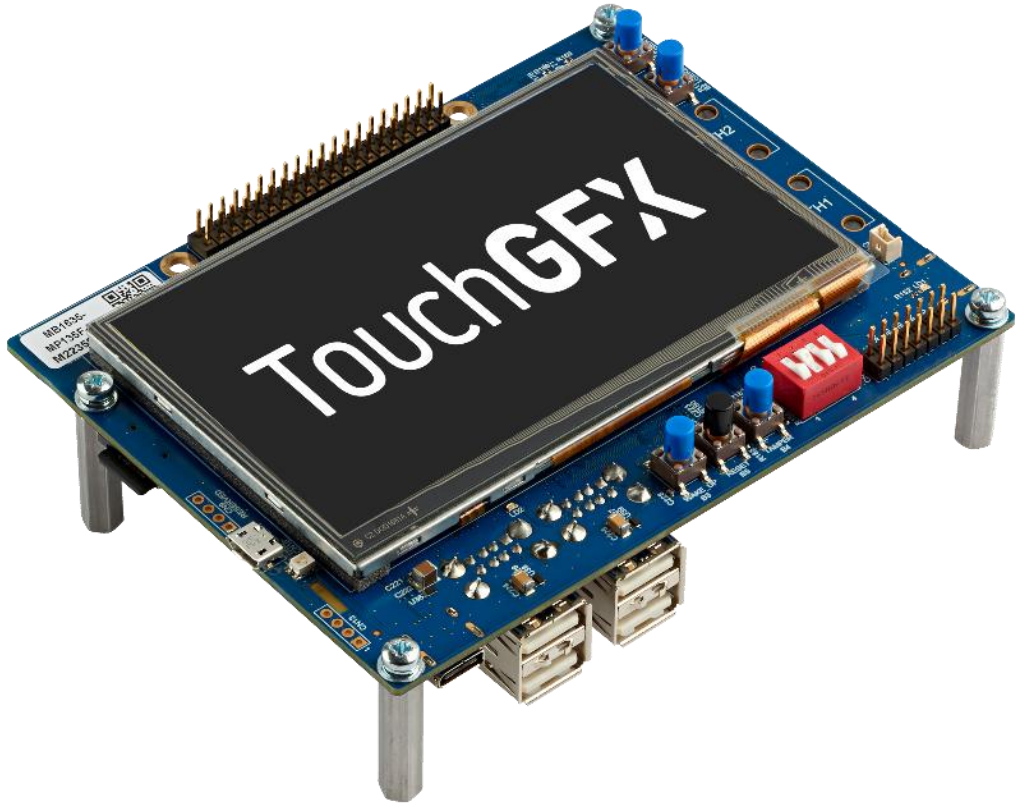
The place to go to learn about the features and functionalities of TouchGFX. Explained by our experts and showcased through practical examples.

On documentation

YouTube

NEW

TouchGFX for STM32 MPUs



Leverage the new software add-on in TouchGFX to implement GUIs on STM32 MPUs.

Download now

Learn more here

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X-LINUX-Qt

NEW

STM32 MPU OpenSTLinux Expansion Package for QT Framework

It contains Linux® Qt™ frameworks, as well as an ST Application Launcher based on Qt™ Framework and application examples to get started with Qt™ application development.

This expansion package is a complete ecosystem that allows developers working with OpenSTLinux to create Qt™ based application very easily.

Download now

Learn more here

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Getting started

Watch the video

1. Select the MCU and pick the associated developer kit

2. Download TouchGFXDesigner here

3. Find your display kit

4. Create/select a demo

5. Flash your display kit

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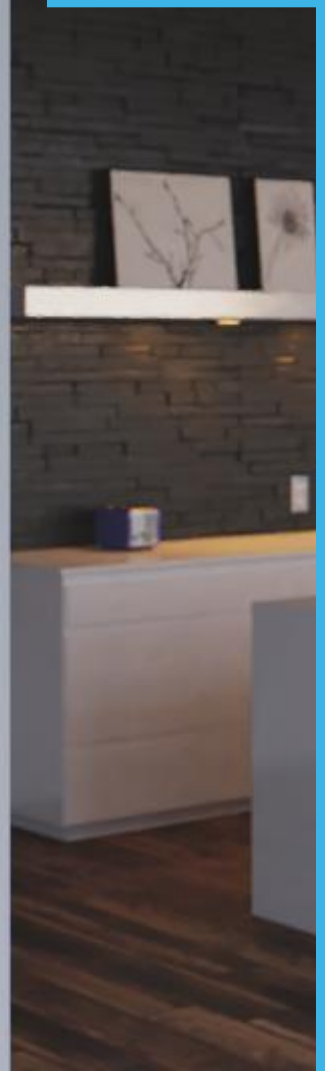
STM32 graphics accelerating the HMI of things



www.st.com/stm32gui

community.st.com

TouchGFX documentation

X-CUBE-TOUCHGFX

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Our technology starts with You

Find out more at www.st.com/STM32GUI

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