



Guide: how to get started with TSD Knob display and TouchGFX



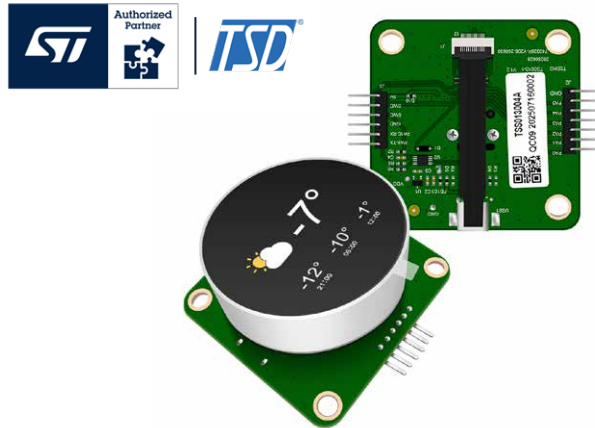
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HARDWARE: TSD 1.3 INCH ROUND ROTARY KNOB DISPLAY

Circular display with rotary switch featuring STM32 microcontroller

- 1.3" TFT LCD knob display
- Resolution: 240x240
- STM32C091 – 256KB flash, 36KB RAM
- 64Mbit SPI flash
- Including Adapter board for flashing and debugging



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SOFTWARE – TOUCHGFX SUPPORTING THE TSD KNOB DISPLAY

To be able to flash "Program and run target" the Knob display directly from TouchGFX Designer on your PC, you need to install USB to UART driver on your PC, IF not installed you will get an error (missing USB to UART driver) when flashing from TouchGFX Designer.

Download the drivers

Low-level Software: In **TouchGFX Designer**, a TouchGFX Board Setup package (TBS) is provided for the display module, which sets up all the available HW, ready to run the UI application. It uses Partial Framebuffer to reduce RAM requirement.

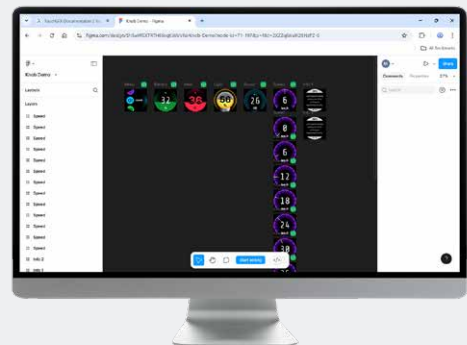


TouchGFX

Download

Graphical assets available

All graphical assets for the Knob-demo Prime is available in Figma



Figma

Discover assets

You want to do your own UI prototype using the knob display

1. Get hands on TSD Knob display

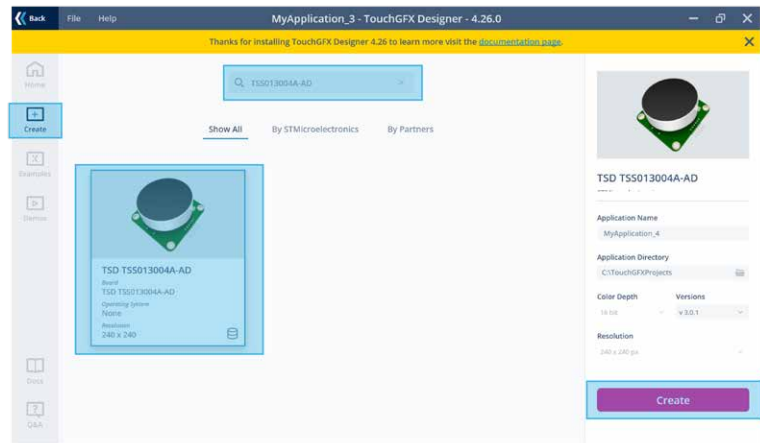
[Order here](#)

2. Download and install TouchGFX Software
(Delivered as X-CUBE-TOUCHGFX)

[Download TouchGFX](#)

3. Run TouchGFX and load the Knob display TBS

- Click on “Create” pane
- Search for “tsd”
- Select the TSD TSS013004A-AD
- “Create”

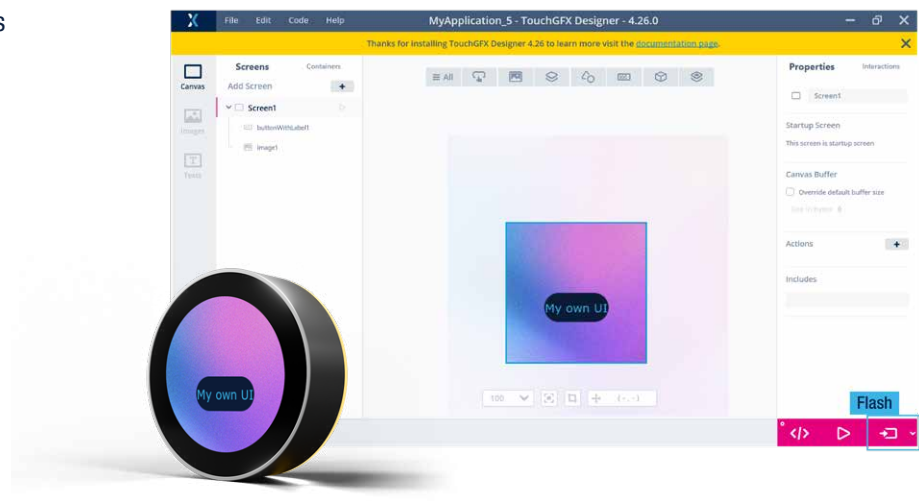


4. Design your UI and add interactions

5. Flash your board

ADDITIONAL RESOURCES

- [Step-by-step tutorials: building applications using TouchGFX](#)
- [Interactions: action to take place when a trigger happens](#)
- [TouchGFX stock: library of ready-to-use free graphical assets](#)



You want to load Lite demo with only internal flash (one-chip solution)

Saving flash

- Simple icons/images for high compression
- All images are compressed L8
- Boxes instead of images used for background

Memory foot print

- Internal RAM 18KB (FB=6K, TouchGFX 12K)
- Internal flash: 123 KB (TouchGFX code= 102K, Fonts=13K Bitmaps=8K)



1. Get hands on TSD Knob display

[Order here](#)

2. Download and install TouchGFX Software
(Delivered as X-CUBE-TOUCHGFX)

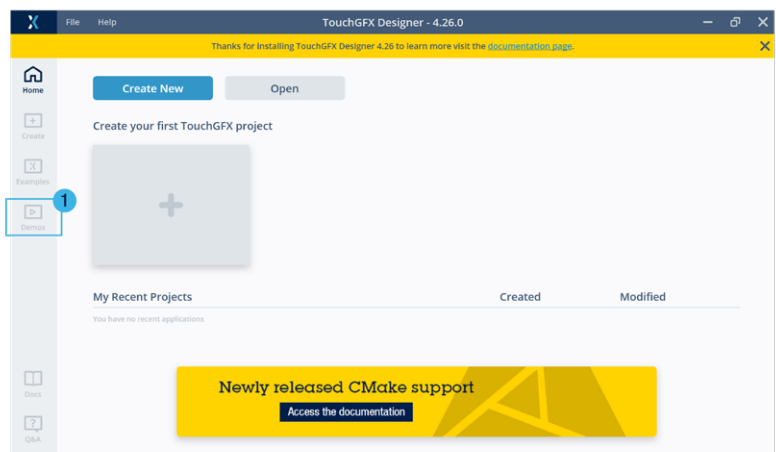
[Download TouchGFX](#)

ADDITIONAL RESOURCES

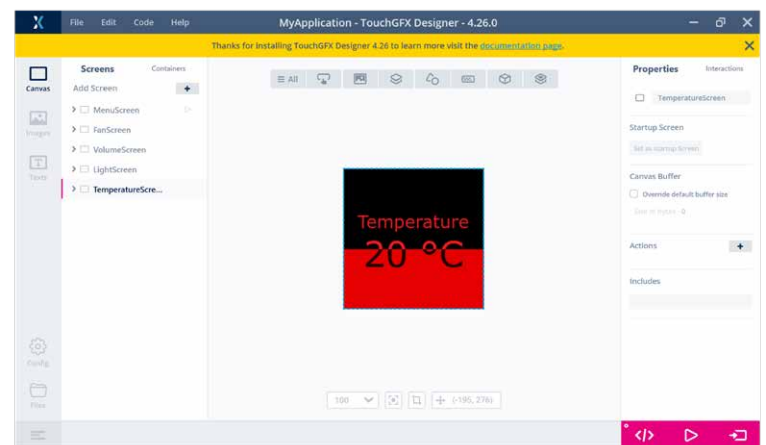
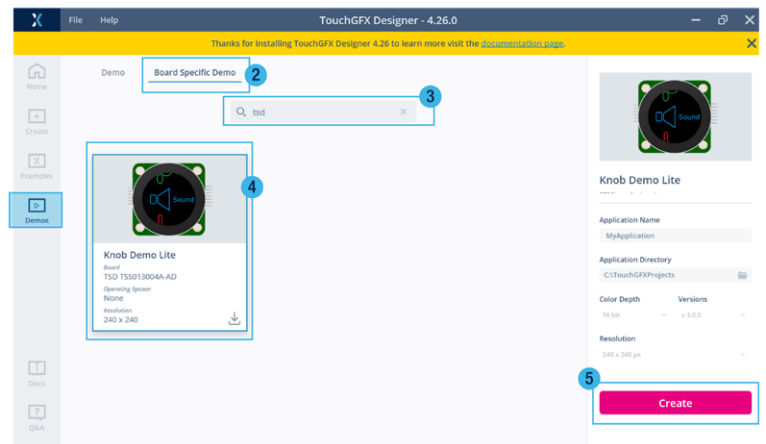
- [How to install TouchGFX](#)

3. Run TouchGFX and load the Knob display TBS

- Open the “Demos” pane



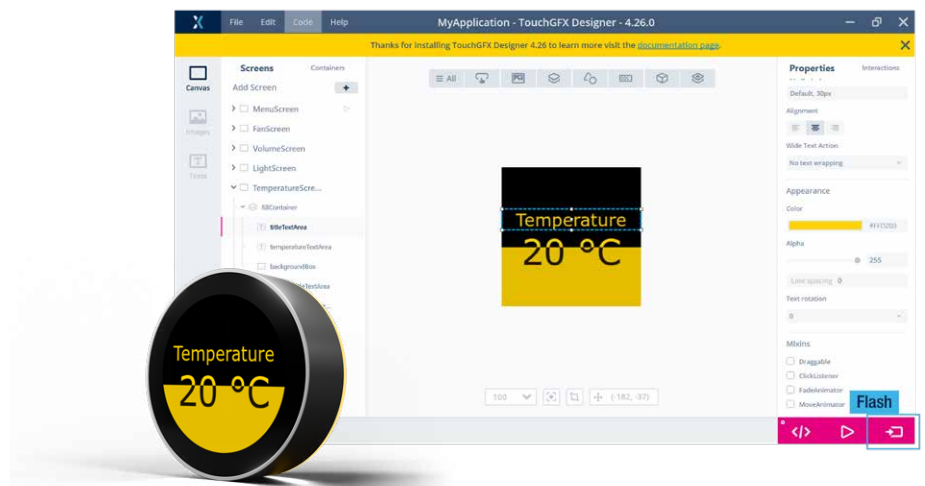
- Under “Board Specific Demo” search for TSD
- Select “Knob Demo Lite”
- Click “Create” for loading the full demo project (TBS+UI application)
- The TBS (Low-level SW) and the Lite Knob demo application will be loaded



4. Custom your UI and add interactions
5. Design your UI and add interactions
6. Flash your board

ADDITIONAL RESOURCES

- [Step-by-step tutorials: building applications using TouchGFX](#)
- [Interactions: action to take place when a trigger happens](#)
- [TouchGFX stock: library of ready-to-use free graphical assets](#)
- [Compiling and flashing](#)



You want to load the prime demo using external flash

For refined graphics (requiring more flash)

- Glow effect using gradients
- Fading effects
- Large fonts
- Images (bitmaps) as background instead of boxes

Memory foot print

- Internal RAM 18KB (FB=6K, TouchGFX 12K)
- Internal flash: 126 KB (TouchGFX code)
- SPI flash: 1.370KB (fonts + Bitmaps)



1. Get hands on TSD Knob display

Order here

2. Download and install TouchGFX Software
(Delivered as X-CUBE-TOUCHGFX)

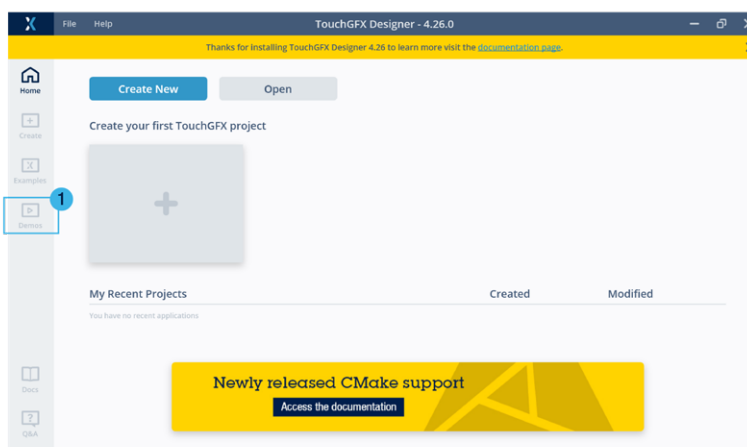
Download TouchGFX

ADDITIONAL RESOURCES

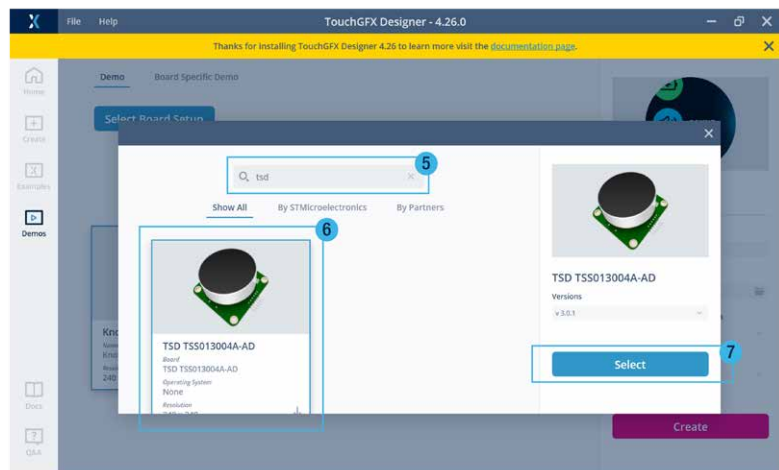
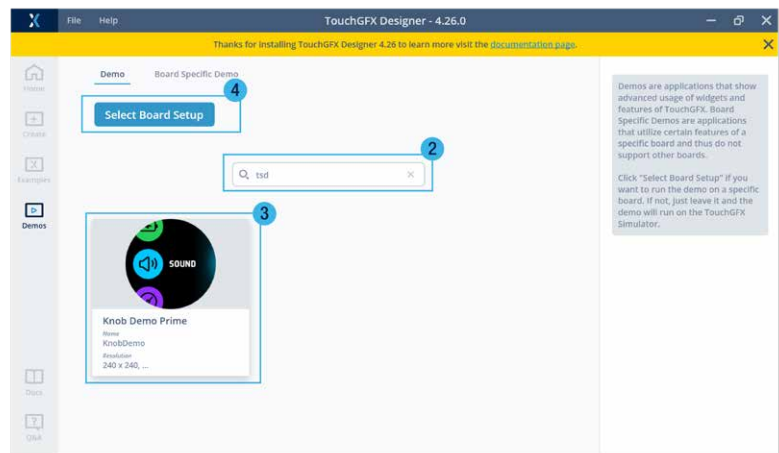
- [How to install TouchGFX](#)

3. Run TouchGFX and load the Knob display TBS and the prime application

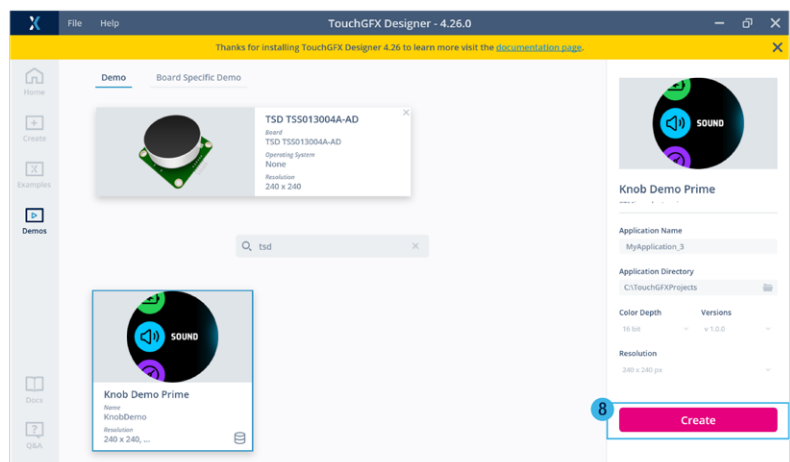
- Open the “Demos” pane



- Search for TSD under Demo pane
 - Select “Knob Demo Prime”
 - Click on select Board Setup
-
- A new pane is open: type “tsd” in the search bar
 - Select the TSD knob display
 - Push “Select”



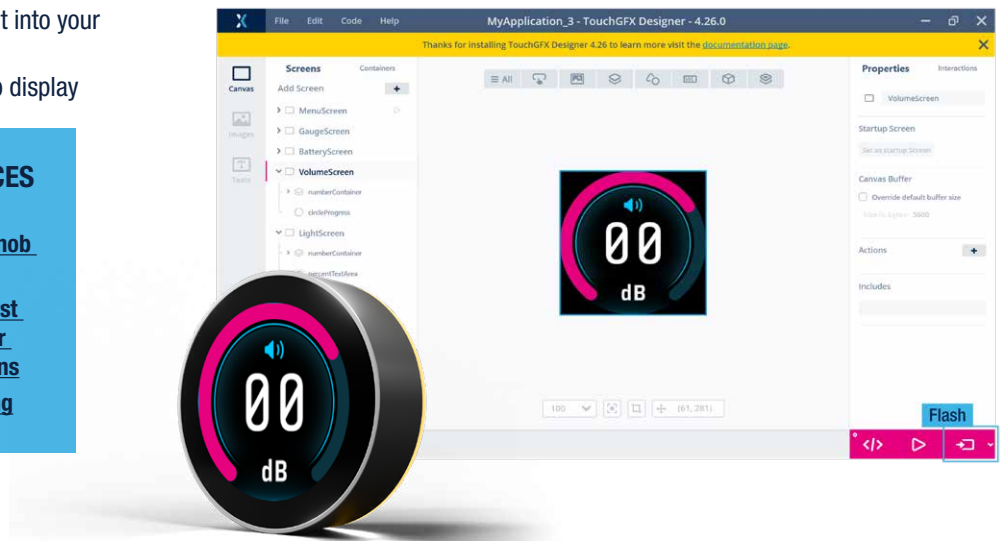
- Click “Create” and the TBS (Low-level SW) and the Prime Knob demo application will be loaded



4. Rework the prime demo, making it into your prototype
5. Flash to your connected TSD knob display

ADDITIONAL RESOURCES

- [Tutorial: Creating an Application for TSD knob display](#)
- [Video: Creating my first GUI with TouchGFX for STM32 GUI applications](#)
- [Compiling and flashing](#)



You want to start on your own STM32 C0 based HW

It is highly recommended to start developing your HW support (custom TBS) on the basis of available TBS in TouchGFX Designer. Doing this you will include the important optimization already done.



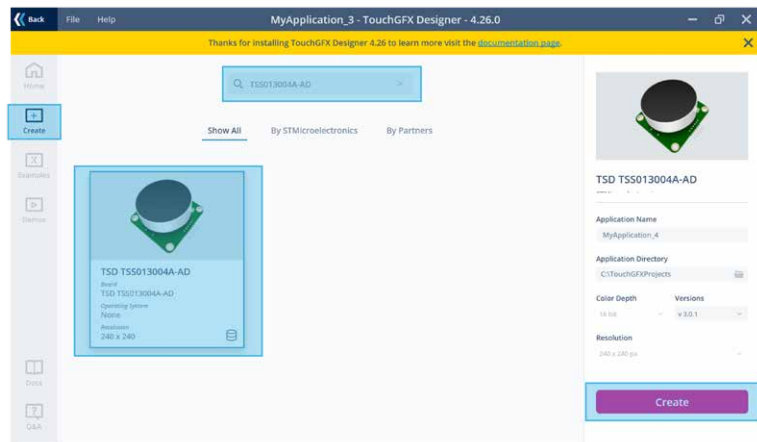
1. Download and install TouchGFX Software (Delivered as X-CUBE-TOUCHGFX)

Download TouchGFX

ADDITIONAL RESOURCES

- [How to install TouchGFX](#)

- If you use external flash for assets, use TBS: TSD TSS013004A-AD



- If you use only internal flash, use the Knob Demo Lite project and extract the TBS.



2. Then adapt as needed to your HW

- Adapt resolution
- Adapt display driver (commands for init and data transfer)
- Adapt display scanline timer to match display draw rate
- Adapt SPI flash reader (commands for data transfer)
- Adapt input decoding (read encoder/buttons/touch)
- Check performance, with few basis screens, transitions etc.
- Start your application prototyping / development.

4. Rework the prime demo, making it into your prototype

5. Flash to your connected TSD knob display

ADDITIONAL RESOURCES

- [Tutorial: Creating Your Own Application](#)
- [Tutorial: My first GUI](#)
- [Compiling and flashing](#)



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