

Getting started with the STM32F429 Discovery kit

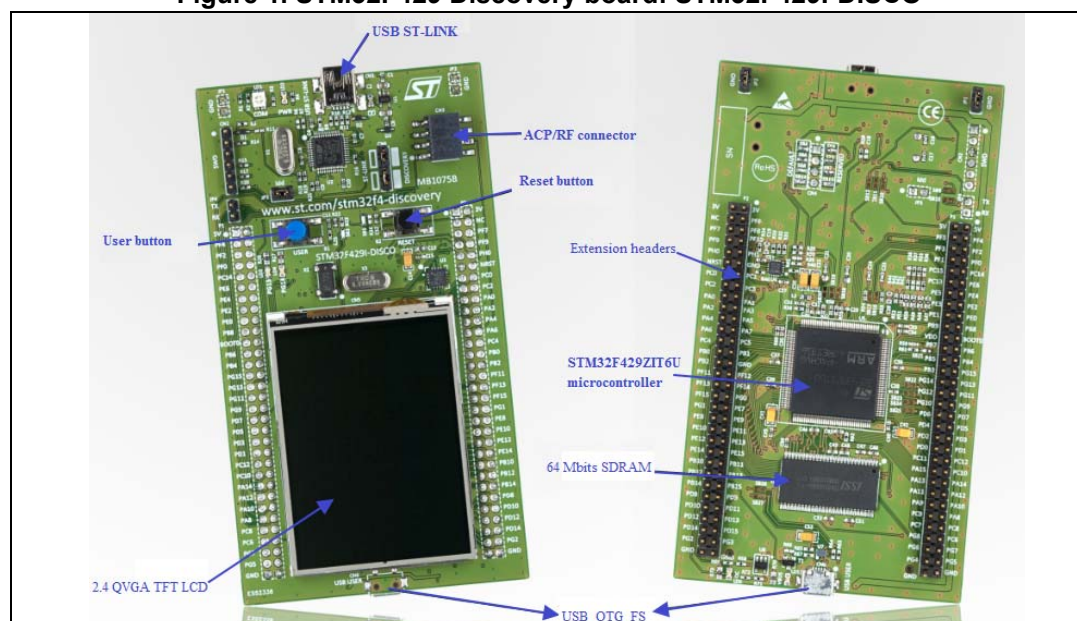
Introduction

This document describes the software, firmware and hardware environments and development recommendations required to build an application around the STM32F429 Discovery kit (32F429IDISCOVERY) with demonstration firmware (STSW-STM32138).

The STM32F429 Discovery kit is a low-cost and easy-to-use development kit to quickly evaluate and start applications with an STM32F4 32-bit ARM[®] Cortex[™]-M4 CPU with FPU high-performance microcontroller. Before installing and using the product, please accept the Evaluation Product License Agreement from www.st.com/stm32f4-discovery.

For more information on the STM32F429 Discovery kit visit www.st.com/stm32f4-discovery. To order the STM32F429 Discovery kit, use the STM32F429I-DISCO order code.

Figure 1. STM32F429 Discovery board: STM32F429I-DISCO



References

- STM32F429xx Datasheet
- STM32F40xxx, STM32F41xxx, STM32F42xxx, STM32F43xxx advanced ARM-based 32-bit MCUs reference manual (RM0090)
- Discovery kit for STM32F429/439 lines (UM1670)
- Getting started with STM32F429 Discovery software development tools
- Forum user question/ discussion.

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1 Hardware configuration and layout

1.1 Features

The STM32F429 Discovery offers the following features:

- STM32F429ZIT6 microcontroller featuring 2 MB of Flash memory, 256 KB of RAM in an LQFP144 package
- On-board ST-LINK/V2 with selection mode switch to use the kit as a standalone ST-LINK/V2 (with SWD connector for programming and debugging)
- Board power supply: through the USB bus or from an external 3 V or 5 V supply voltage
- L3GD20, ST MEMS motion sensor, 3-axis digital output gyroscope
- TFT LCD (Thin-film-transistor liquid-crystal display) 2.4", 262K colors RGB, 240 x 320 dots
- SDRAM 64 Mbits (1 Mbit x 16-bit x 4-bank) including an AUTO REFRESH MODE, and a power-saving
- Six LEDs:
 - LD1 (red/green) for USB communication
 - LD2 (red) for 3.3 V power-on
 - Two user LEDs:
LD3 (green), LD4 (red)
 - Two USB OTG LEDs:
LD5 (green) VBUS and LD6 (red) OC (over-current)
- Two pushbuttons (user and reset)
- USB OTG with micro-AB connector
- Extension header for LQFP144 I/Os for a quick connection to the prototyping board and an easy probing

1.2 Microcontroller

The STM32F429ZIT6U device is based on the high-performance ARM[®] Cortex[™]-M4 32-bit RISC core operating at a frequency of up to 180 MHz. The Cortex-M4 core features a Floating point unit (FPU) single precision which supports all ARM single-precision data-processing instructions and data types. It also implements a full set of DSP instructions and a memory protection unit (MPU) which enhances application security.

The STM32F429ZIT6U device incorporates high-speed embedded memories (2 Mbytes of Flash memory, 256 Kbytes of SRAM), up to 4 Kbytes of backup SRAM, and an extensive range of enhanced I/Os and peripherals connected to two APB buses, two AHB buses and a 32-bit multi-AHB bus matrix.

1.3 System requirement

- Windows PC (XP, Vista, 7)
- USB type A to Mini-B USB cable
- ST-LINK/V2
- Supported IDE are EWARM (IAR Embedded Workbench®), MDK-ARM™ and Atollic TrueSTUDIO®

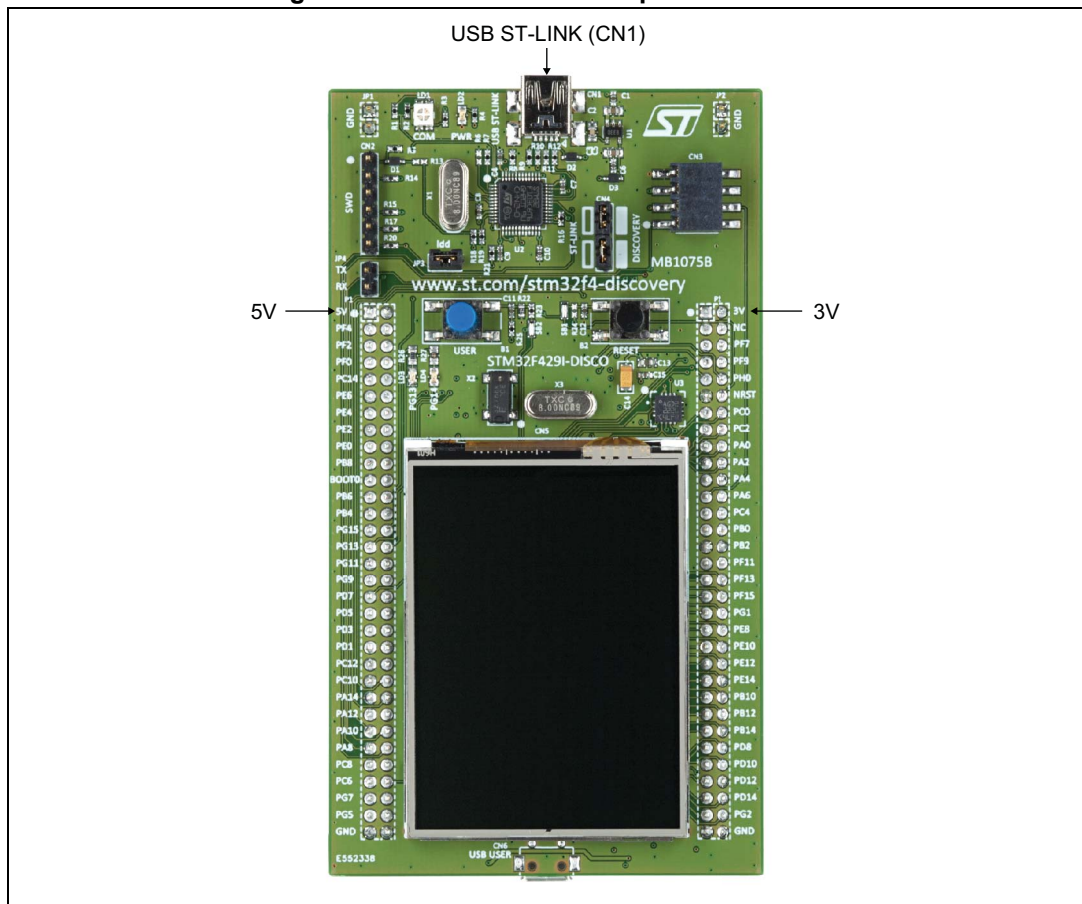
Note: Required information to download and install desired IDE and ST-LINK/V2 are detailed in *Getting started with STM32F429 Discovery software development tools document.*

1.4 Powering up the board

The STM32F429I-DISCO board can be powered up from three sources.

- USB ST-LINK: To power the board from the USB connector CN1, use the 'USB type A to Mini-B' cable and connect it between the host and the board USB connector CN1.
- External sources: DC power supply can be inserted in the GND and 3 V (or 5 V) pin.

Figure 2. STM32F429I-DISCO power sources



1.5 Reset the board

There are three ways to reset the board:

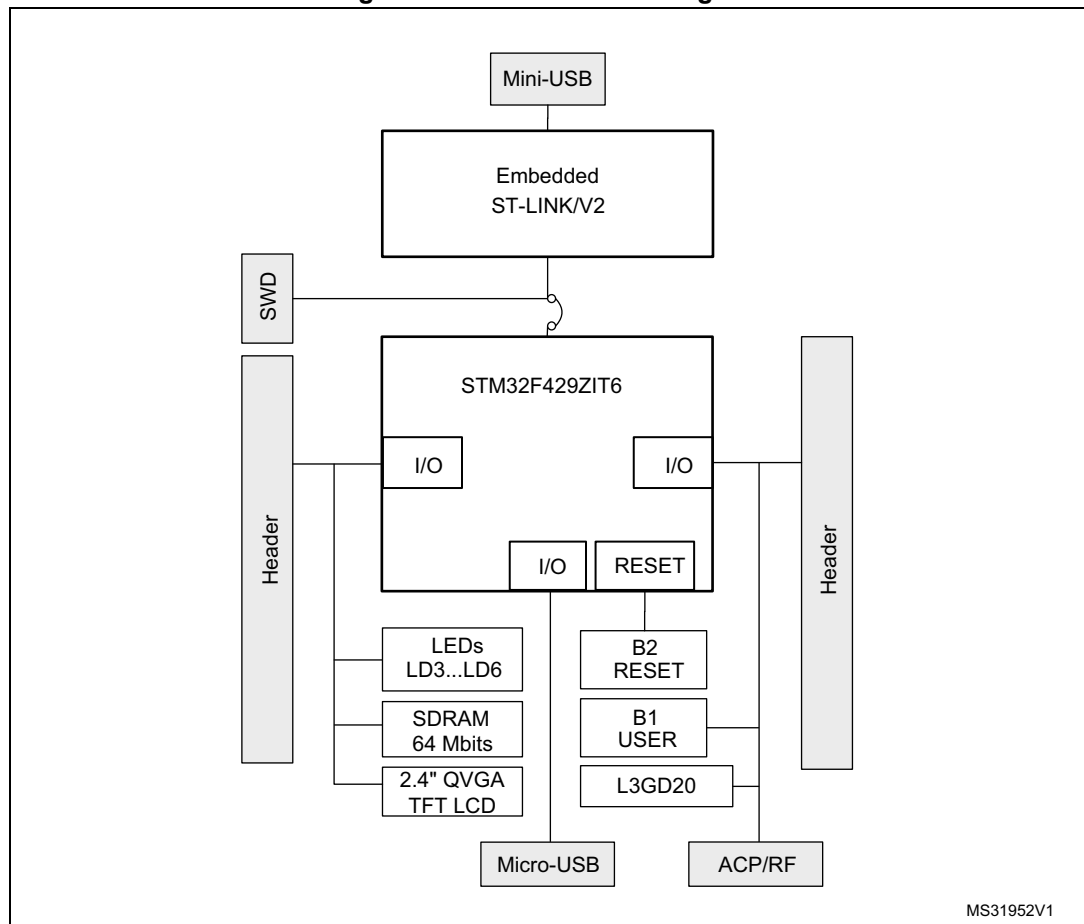
- Push the reset button mounted on the STM32F429I-DISCO.
- Remove and reinsert the USB cable.
- The MCU can also be reset by debuggers.

1.6 Hardware block diagram

The STM32F429I-DISCO is designed around the STM32F429ZIT6U microcontroller in a 144-pin LQFP package. *Figure 3* illustrates the connections between the STM32F429ZIT6U and its peripherals (STLINK/V2, pushbutton, LED, USB and connectors).

Please refer to schematic under www.st.com/stm32f4-discovery for more details.

Figure 3. Hardware block diagram



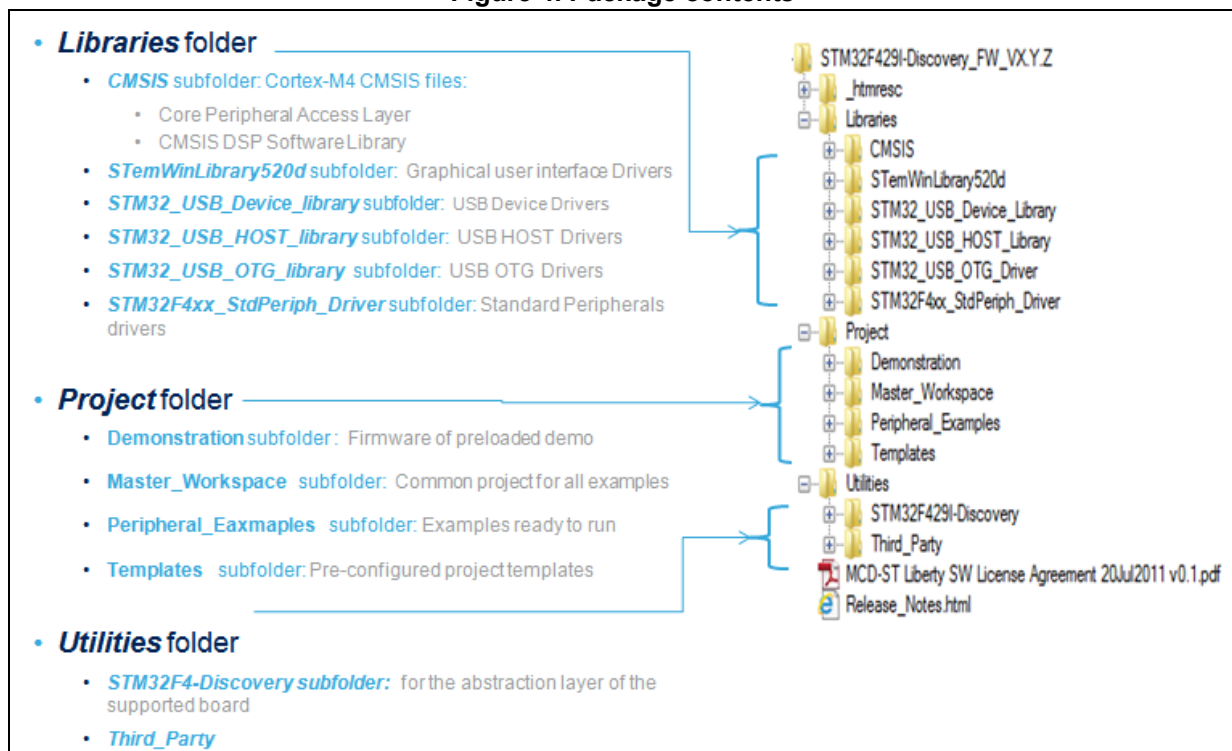
2 Firmware package

To get started with the STM32F429 Discovery kit, a firmware package that contains a set of IP examples and demonstrations of some features exists under www.st.com/stm32f4-discovery.

2.1 Package description

The STM32F429 Discovery firmware applications, demonstration and IPs examples are provided in one single package and supplied in one single zip file. The extraction of the zip file generates one folder, *STM32F429I-Discovery_FW_VX.Y.Z*, which contains the following subfolders:

Figure 4. Package contents



User can run examples provided within this package. A set of examples for each peripheral are ready to be run.

2.2 Programming firmware application

To start programming, user must:

- Install preferred Integrated Development Environment (IDE)
- Install the ST-LINK V2 driver from ST web site

2.2.1 Programming application

To program application (demonstration or example), follow the sequence below:

1. Go under application folder
2. Chose the desired IDE project
3. Double click on the project file (ex. *STM32F429I-Discovery_Demo.eww* for EWARM)
4. Rebuild all files: Project->Rebuild all
5. Load project image: Project->Debug
6. Run program: Debug->Go

Please refer to ***Getting started with STM32F429 Discovery software development tools*** for more details.

2.2.2 Run pre-loaded demo

To run and develop any firmware applications on your STM32F429 Discovery board, the minimum requirements are as follows:

- Windows PC (XP, Vista, 7)
- 'USB type A to Mini-B' cable, used to power the board (through USB connector CN1) from host PC and connect to the embedded ST-LINK/V2 for debugging and Programming.

Additional hardware accessories will be needed to run some applications:

- 'USB type A to Micro-B' cable, used to connect the board (through USB connector CN5) as USB Device to host PC.

Establish the connection with the STM32F429 Discovery board as follows:

Figure 5. Hardware environment



The demonstration software, based on the STemWin GUI library, is already preloaded in the board's Flash memory. It uses the LCD TFT mounted on the board to show the Menu based-on-icon view widget (Image Browser, Game, Performance, Clock/Calendar, Video and System Info module). The status bar indicate the CPU Usage, date, USB disk flash connection state, alarm and time.

Follow the sequence below to configure the STM32F429 Discovery board and launch the DISCOVER application:

1. Ensure that the jumpers JP3 and CN4 are set to "on" (Discovery mode).
2. Connect the STM32F429 Discovery board to a PC using a USB cable type A/mini-B through the USB ST-LINK connector CN1, to power the board. The LEDs LD2 (PWR) and LD1 (COM).
3. The following applications are available on the screen:
 - Clock/Calendar and Game
 - Video Player and Image Browser (play videos and view images from the USB mass storage connected to CN6)
 - Performance monitor (watch the CPU load and run a graphical benchmark)
 - System Info
4. The demo software, as well as other software examples that allow you to discover the STM32 F4 series features, are available on www.st.com/stm32f4-discovery.
5. Develop your own applications starting from the examples.

3 Revision history

Table 1. Document revision history

Date	Revision	Changes
09-Sep-2013	1	Initial release.

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