

使用STM32 设计HMI-工具

介绍STM32 GUI Massmarket集成化工具STM32CubeMX

STM32提供完整的开发平台

2

Mass
Market
工具



ST
软件



ST领
先的
硬件



STM32CubeMX
PC端MCU配置工具

STemWin

FREE

TouchGFX

Embedded
Wizard

L496

M4 @ 80 MHz
Chrom-ART

Display Parallel IF
320 KB RAM
FSMC
QSPI

L4R9

M4@ 120 MHz
Chrom-ART
Chrom-GRC

DSI Display parallel IF
640 KB RAM
FSMC
QSPI

F429

M4 @ 180MHz
Chrom-ART

TFT ctrl
Display parallel IF
256 KB RAM
FMC

F469

M4 @ 180MHz
Chrom-ART

DSI & TFT ctrl
Display parallel IF
384 KB RAM
FMC
QSPI

F746

M7@ 216 MHz
Chrom-ART

TFT Ctrl
Display parallel IF
320 KB RAM
FMC
QSPI

F769

M7@ 216 MHz
Chrom-ART
JPEG Codec

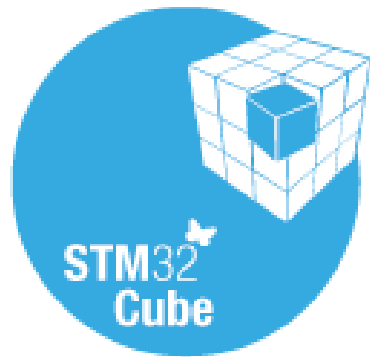
DSI & TFT ctrl
Display parallel IF
512 KB RAM
FMC
QSPI

H7

M7@ 400 MHz
Chrom-ART
JPEG Codec

TFT ctrl
Display parallel IF
1M RAM
FMC
QSPI





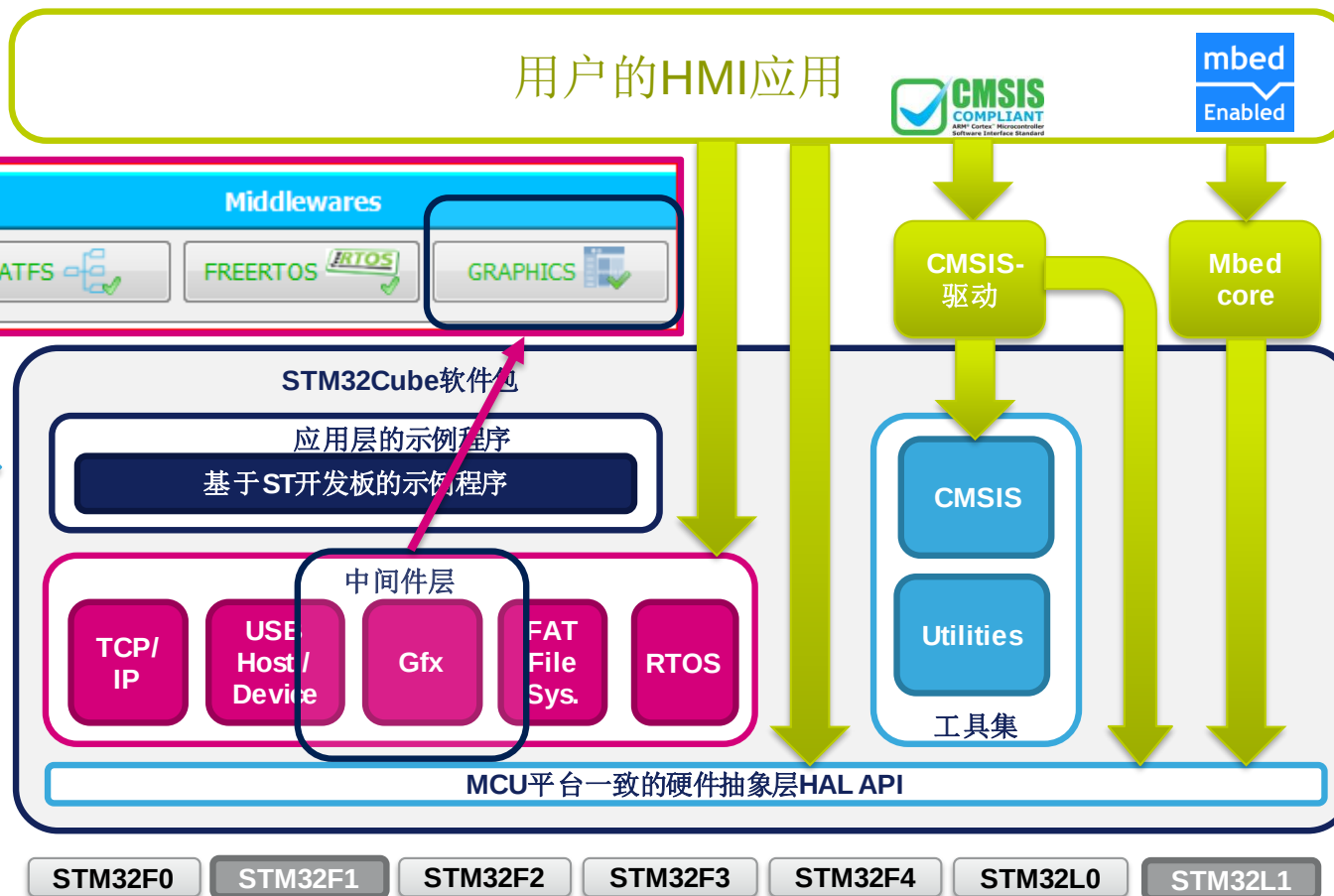
Massmarket工具

• STM32Cube

STM32CubeMX
PC端MCU配置工具



根据用户的应用生成
初始化的C代码



STM32CubeMX可以协助我们

平台选择

硬件设计

软件设计

我们的产品需要驱动
一个800x480的MIPI
屏，实现一个应用，
我该如何选择？



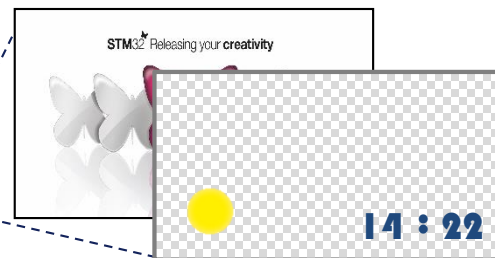
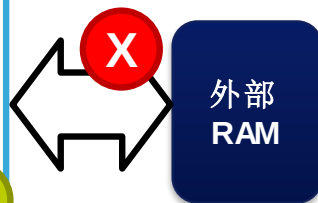
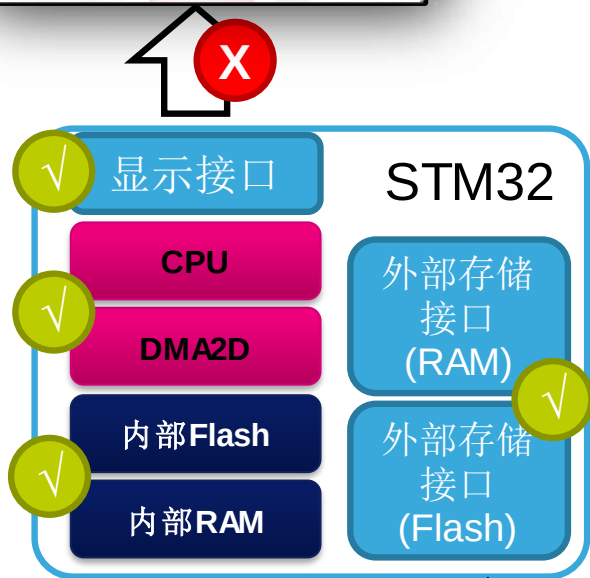
“IP清单”是不够的

平台选择

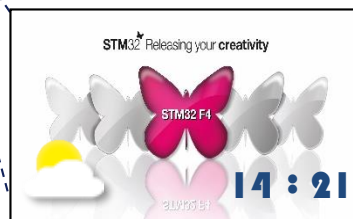
硬件设计

软件设计

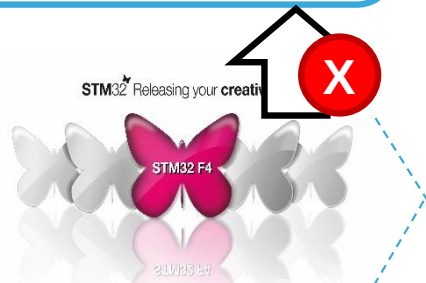
如果某些部分的带宽不够该怎么办？



用overlay更新缓存



刷新缓存



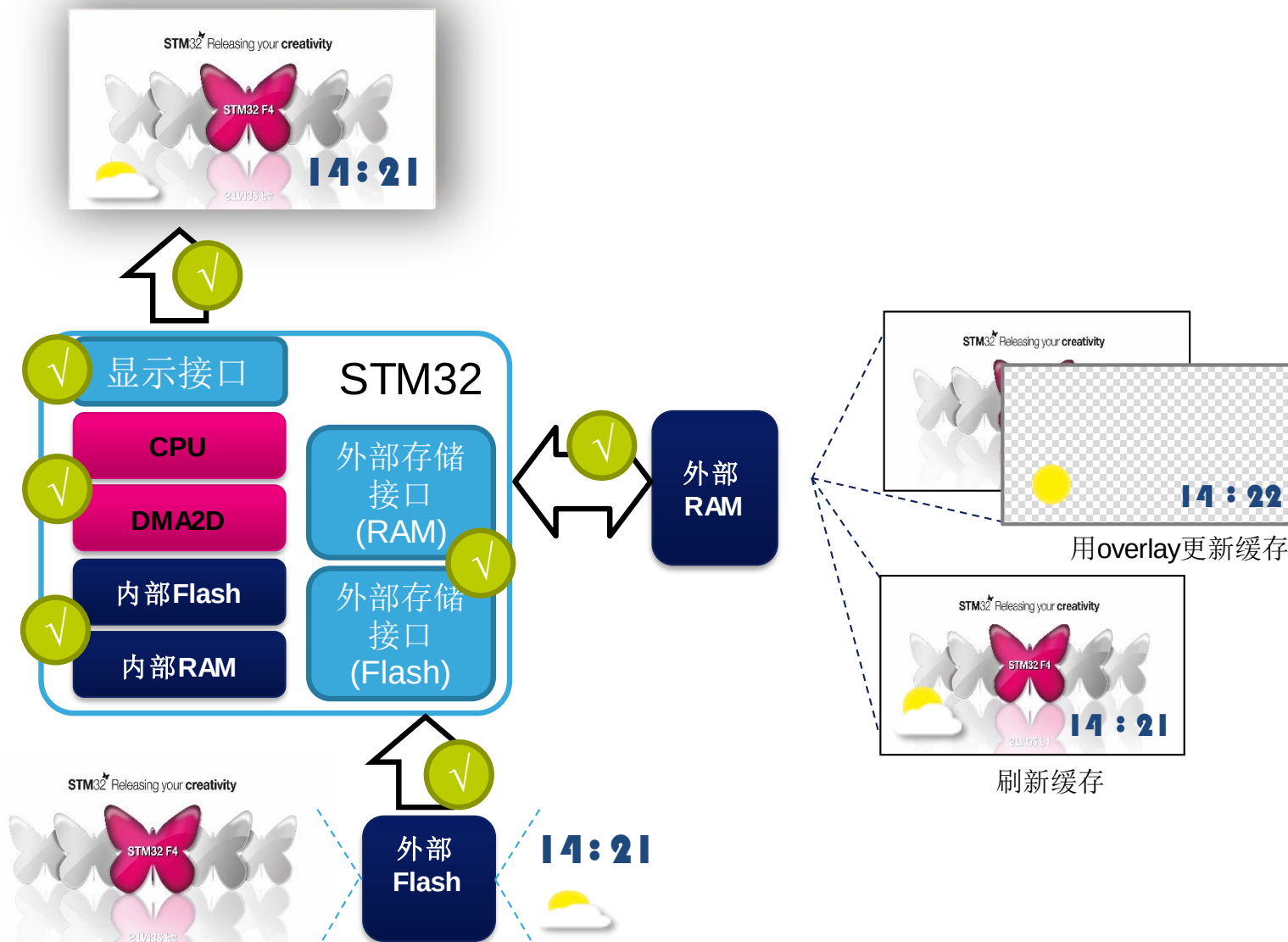
14:21

答案: 从显示系统层面进行选型

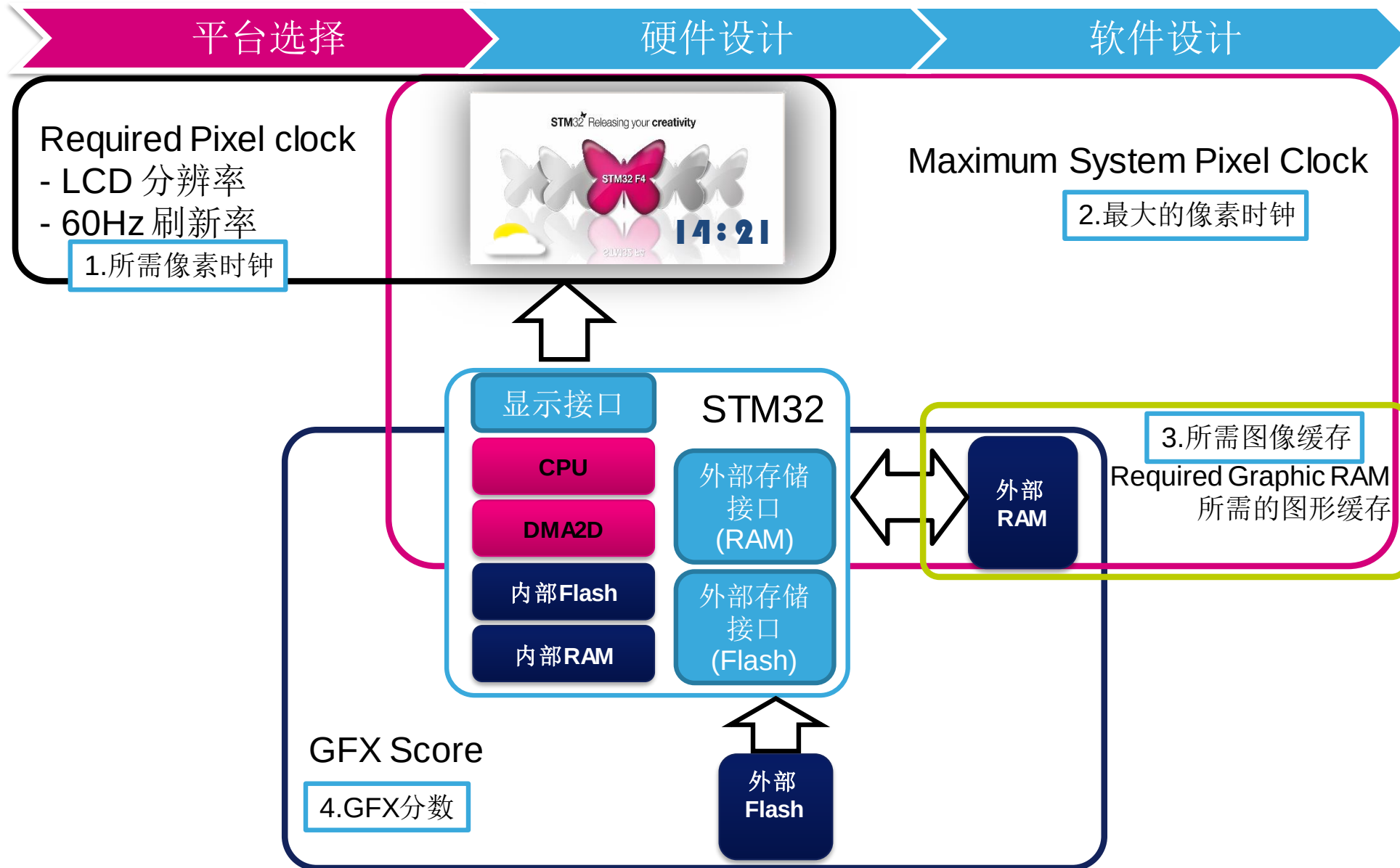
平台选择

硬件设计

软件设计



我们需要了解系统的图像处理性能



STM32CubeMX协助我们了解系统的 图像处理性能

平台选择

硬件设计

软件设计

选择不同的系统配置

通过选择配置，我们可以得到：

- 所需要的图像缓存RAM大小
- 像素时钟信息

1.所需像素时钟

3.所需图像缓存

2.最大的像素时钟

4.GFX分数

GFX分数帮助选择最合适的STM32 MCU平台

MCUs List: 16 items

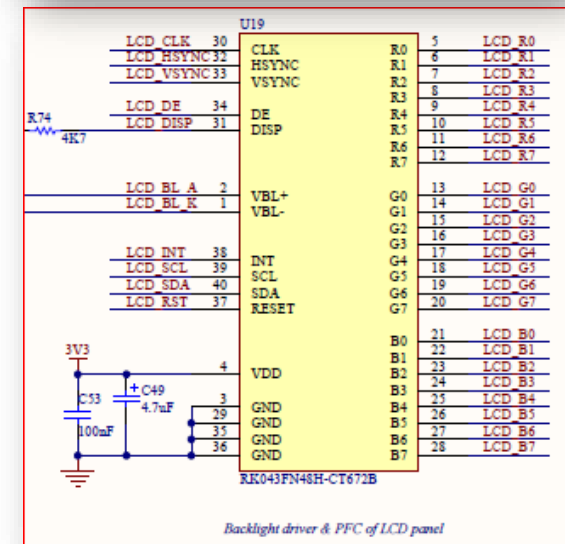
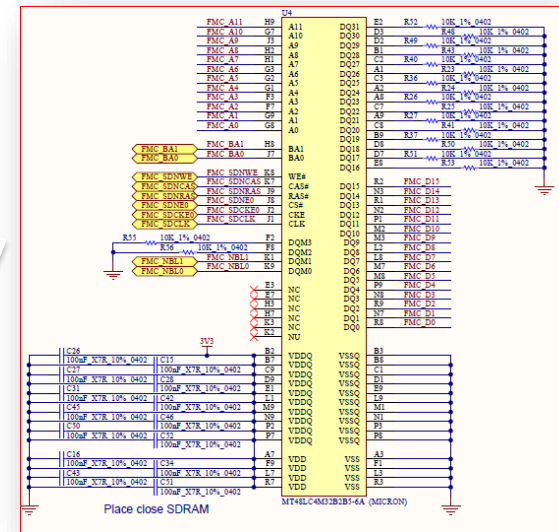
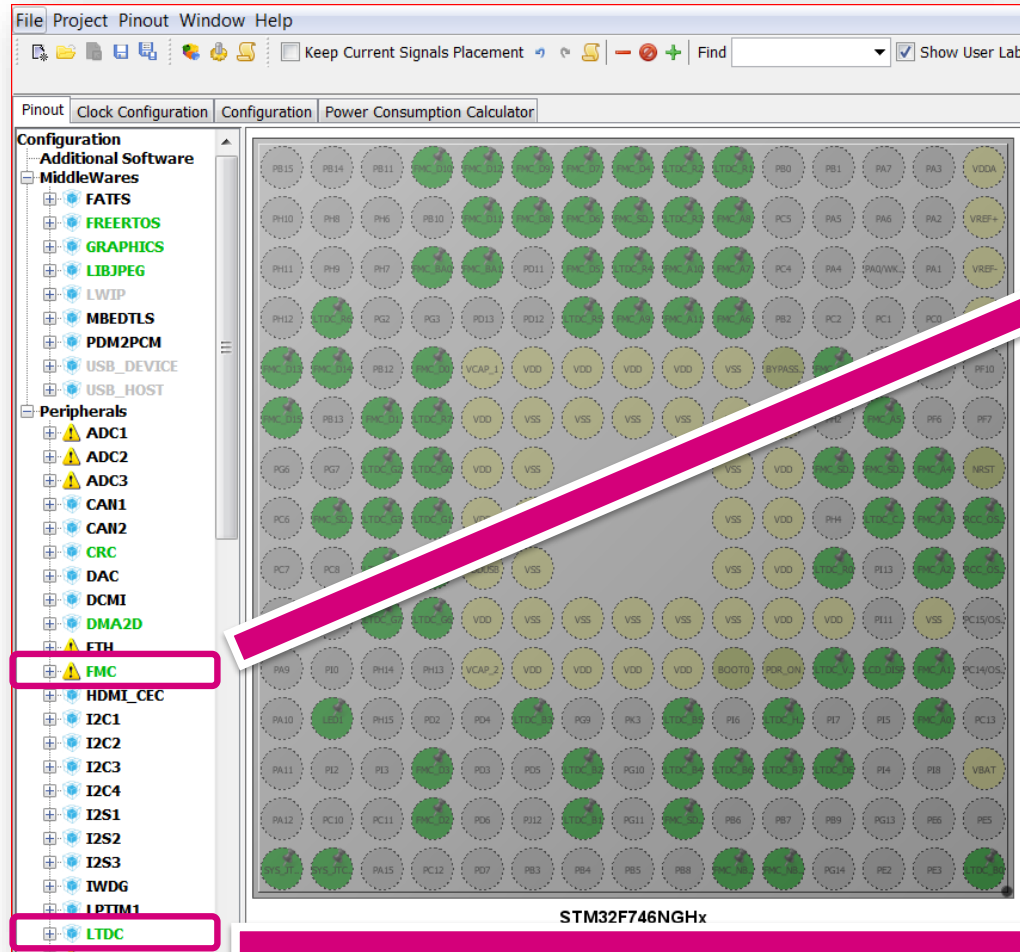
	Part No	Reference	Marketing...	Unit Price fo...	Board	Package	Flash	RAM	IO	Freq.	GFX S...
☆	STM32F405	STM32F405...	Active	6.88	3...	LQFP144	2048 kBytes	256 kBytes	114	180 MHz	562.8
☆	STM32F407	STM32F407...	Active	9.051		LQFP176	2048 kBytes	384 kBytes	131	180 MHz	562.8
☆	STM32F409	STM32F409...	Active	9.514	3...	TFBGA216	2048 kBytes	384 kBytes	159	180 MHz	562.8
☆	STM32F429ZI	STM32F429...	Active	8.357		LQFP100	2048 kBytes	384 kBytes	71	180 MHz	562.8
☆	STM32F469ZI	STM32F469...	Active	8.82		LQFP144	2048 kBytes	384 kBytes	106	180 MHz	562.8
☆	STM32F746IG	STM32F746...	Active	8.24		LQFP176	1024 kBytes	320 kBytes	140	216 MHz	626.9
☆	STM32F74...	STM32F74...	Active	8.703	3...	TFBGA216	1024 kBytes	320 kBytes	168	216 MHz	626.9
☆	STM32F74...	STM32F74...	Active	7.43		LQFP100	1024 kBytes	320 kBytes	82	216 MHz	626.9

STM32CubeMX硬件引脚分配

平台选择

硬件设计

软件设计



STM32CubeMX开发应用

平台选择

硬件设计

软件设计

The image displays the STM32CubeMX and IAR Embedded Workbench IDE environments. The STM32CubeMX interface shows the configuration for the STM32F469NIHx microcontroller, including the selection of the F469NIHx device, the selection of the STM32F469NIHx package, and the configuration of the F469NIHx peripheral (FMC). The IAR Embedded Workbench IDE shows the project structure for the TEST6 project, including the source files (Application, User, Core, Target, GUIConf.c, HW_Init.c, STMWin_wrapper.c) and the build output (Messages, Total number of errors: 0, Total number of warnings: 0). The IDE also displays the HAL_LTDC_MspInit(LTDC_Har) function in the HW_Init.c file.

STM32CubeMX TEST6.ioc: STM32F469NIHx

Configuration

- MiddleWares**
 - FATFS**
 - External SDRAM
 - User-defined
 - FREERTOS**
 - Enabled
 - GRAPHICS**
 - Stacks Graphics
 - Display Interface
 - GRAPHICS Acceleration
 - LIBJPEG**
 - Enabled
 - MBEDTLS**
 - Enabled
- Peripherals**
 - CRC**
 - Activated
 - DMA2D**
 - Activated
 - DSIHOST**
 - Adapted Configuration
 - FMC**
 - SDRAM 1
 - Clock and chip enable
 - Internal bank number
 - Address: 12 bits
 - Data: 32 bits
 - Byte enable: 32-bit
 - IWDG**
 - Activated

Property Value

Property	Value
Name	Image
xPos	0
yPos	0
xSize	50
ySize	50
Extra bytes	0
BMP file	BMP

Project - IAR Embedded Workbench IDE - ARM 7.80.4

Workspace

- TEST6
 - Files
 - TEST6 - TEST6
 - Application
 - EWARM
 - startup_stm32f469xx.s
 - User
 - App
 - GUI_App.c
 - WindowDLG.c
 - Core
 - Target
 - GUIConf.c
 - HW_Init.c
 - STMWin_wrapper.c
 - Drivers
 - Middlewares
 - STMWin

Messages

```

Building configuration: TEST6 - TEST6
Updating build tree...
STMWin_wrapper.c
Linking

Total number of errors: 0
Total number of warnings: 0
  
```

HAL_LTDC_MspInit(LTDC_Har)

```

if (ltdevHandle->Instance==LTDC)
{
  /* USER CODE BEGIN LTDC_MspInit 0 */
  /* USER CODE END LTDC_MspInit 0 */
  /* Enable Peripheral clock */
  __HAL_RCC_LTDC_CLK_ENABLE();

  /* Peripheral interrupt init */
  HAL_NVIC_SetPriority(LTDC_IRQn, 15, 0);
  HAL_NVIC_EnableIRQ(LTDC_IRQn);
}
  
```

STM32

STM32释放你的创造力!

Errors 0, Warnings 0 Ln 341, Col 35 System NUM



STM32为了HMI开发提供了

现场培训

Mass
Market
工具

ST领先的
硬件

ST
软件

合作伙伴



Thanks!

12



For more information please kindly visit

www.st.com/stm32

www.stmcu.com.cn

www.stmcu.org