TM4C123GH6PM:-

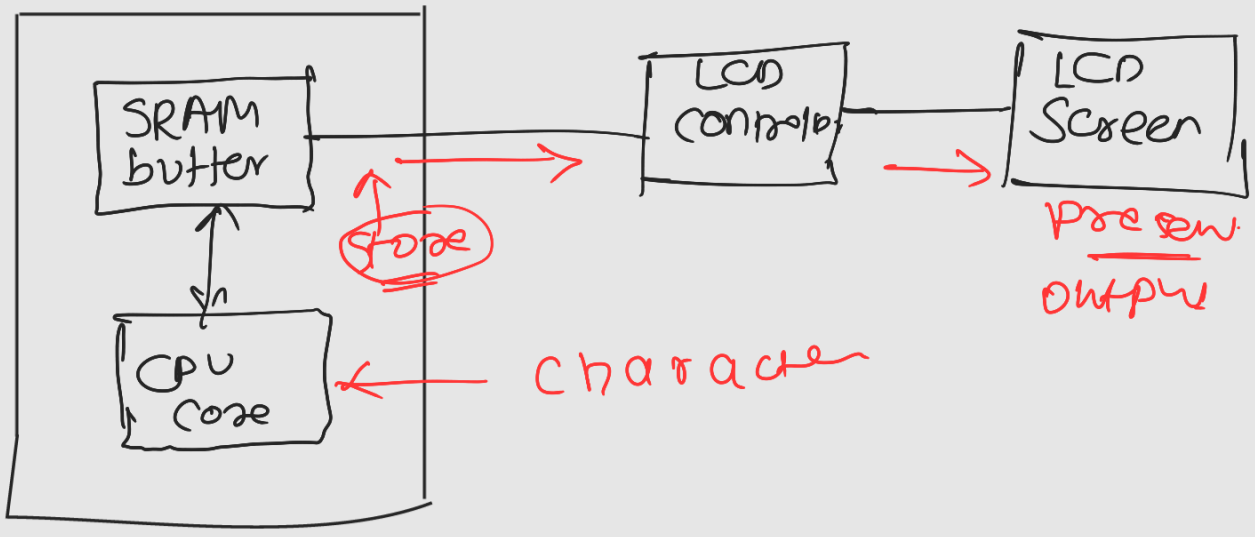
Agenda:-

- Overview,
  - LCD controller
  - key features

- Modes & configuration:
  - Raster controller
  - LCD interface display driver (LIDD)

- Software support:
  - Driver library
  - Graphics Library

controller
16 x 2 = Hitachi



→ raw image data is stored in a buffer in SRAM

→ LCD controller reads the data from image buffer. translate it into a

format that LCD screen can display.

→ send it correct timing, such that the desired image is displayed correctly.

** configuration like this one shown only works for some application.

Reason:- i) CPU core must read every pixel from SRAM & rewrite to LCD controller This consume significant amount of processor bandwidth.

ii) SRAM may not be large enough to hold all image data you need.

So to overcome this??

→ So, TI has developed new integrated LCD controller in TM4C123GH6PM, which has large frame buffer to store large images.

→ Features:-

- provide a configurable parallel interface specialized for
  1) TFT-LCD screen
  2) Passive matrix LCD panels
  3) OLED panels
  4) Character based LCD panels

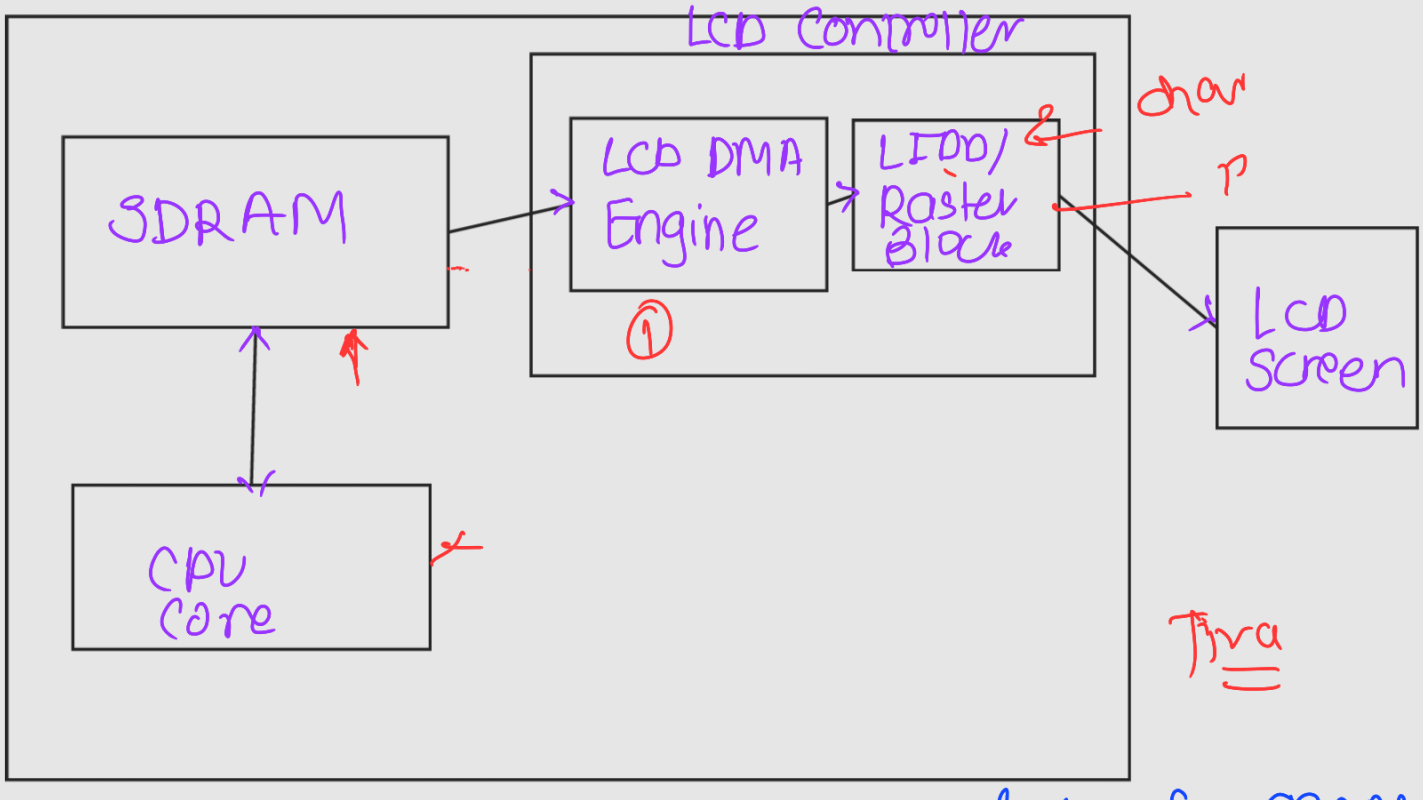
5) Panels with or without integrated LCD controllers.

→ Benefits:-

→ 1) Constant refresh rate

→ 2) conversion pixel colors to RGB

TM4C123GH...



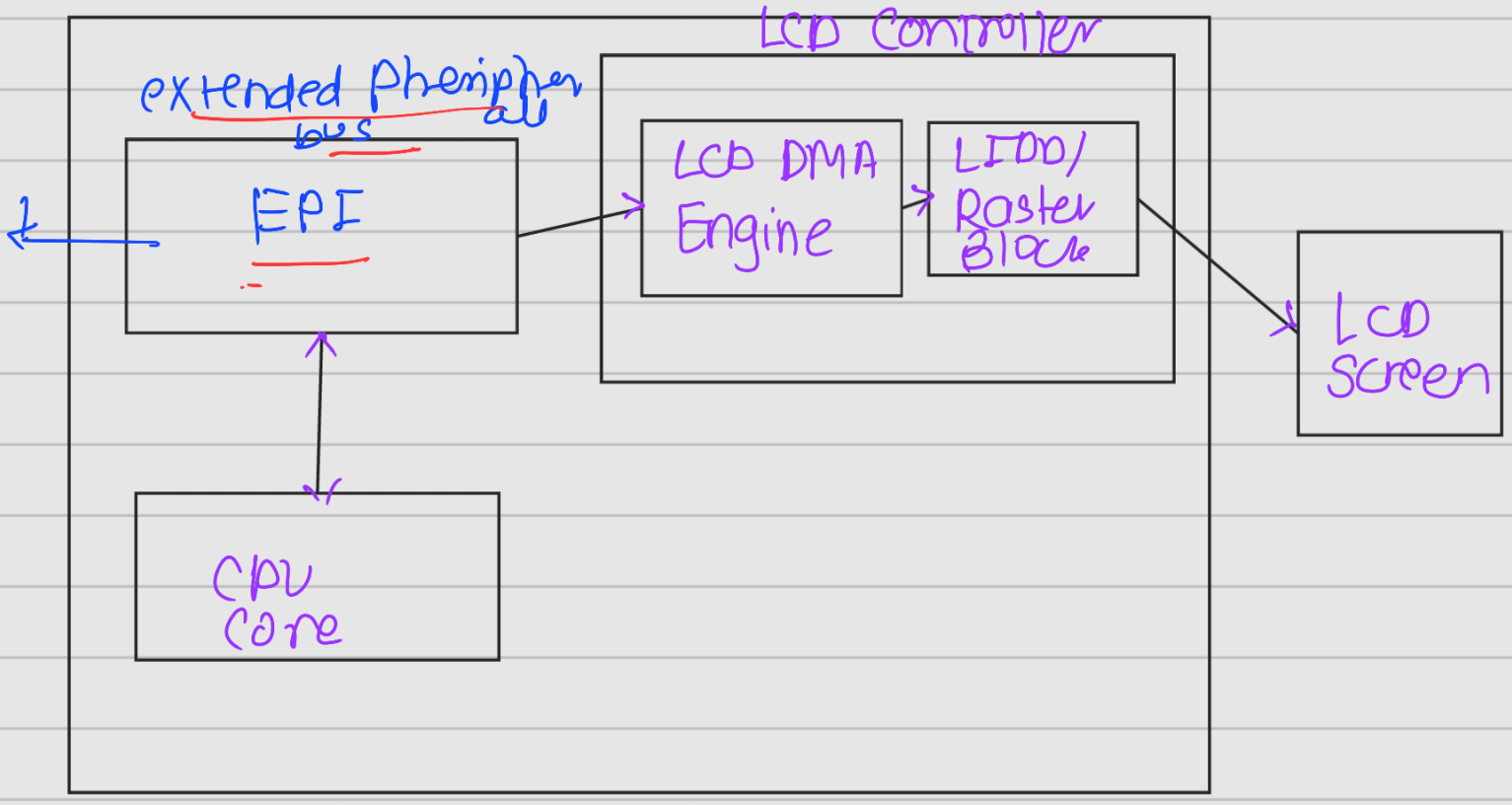
→ CPU core will feed image data to SRAM buffer

→ LCD DMA engine will continuously read the image data until the CPU request to stop

→ own dedicated ~~high~~ priority DMA it dont have to steal cycles from uDMA module

→

SPRAM



⊙ LCD controller Modes :-

Raster mode	LCD interface Display driver mode
⊙ main choice for TFT or STN displays	⊙ Main choice for character-based displays or displays with controller
⊙ DMA module is active	⊙ can be used, but direct CPU acess is also allowed
⊙ LCD controller reads raw image data directly from memory (-RGB, Greyscale)	⊙ LCD controller takes commands or general purpose data as input reformats for chosen LCD.

- output formatted for controller less displays (HSYNC, VSYNC, etc)

Software support :-

Peripheral driver library	Graphics library
• APIs to initialize and configure LCD controller direct acess to LIDD controller and LCD/DMA engine.	Provides a set of graphics primitives and widget set for creating GUI's
• driverlib/LCD.h driverlib/LCD.c LCD character based	• based on three layers display driver; Graphics primitives & widget layer
• LCDClockReset(),	• located in grlib folder • CanvasInit()

16×2 LCD
which has its own controller.