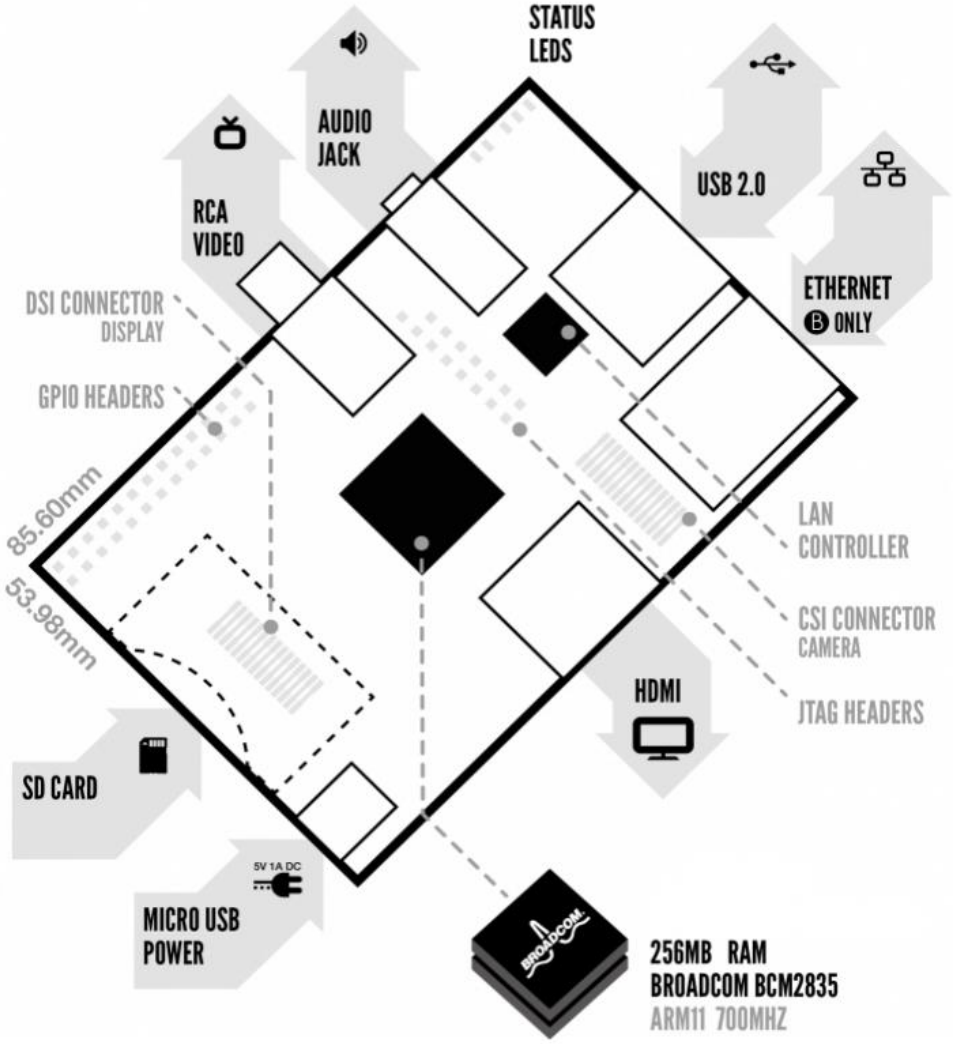
LABORATORIO: RB-PI

ARQUITECTURA DE COMPUTADORAS 2016

Raspberry Pi Model A B

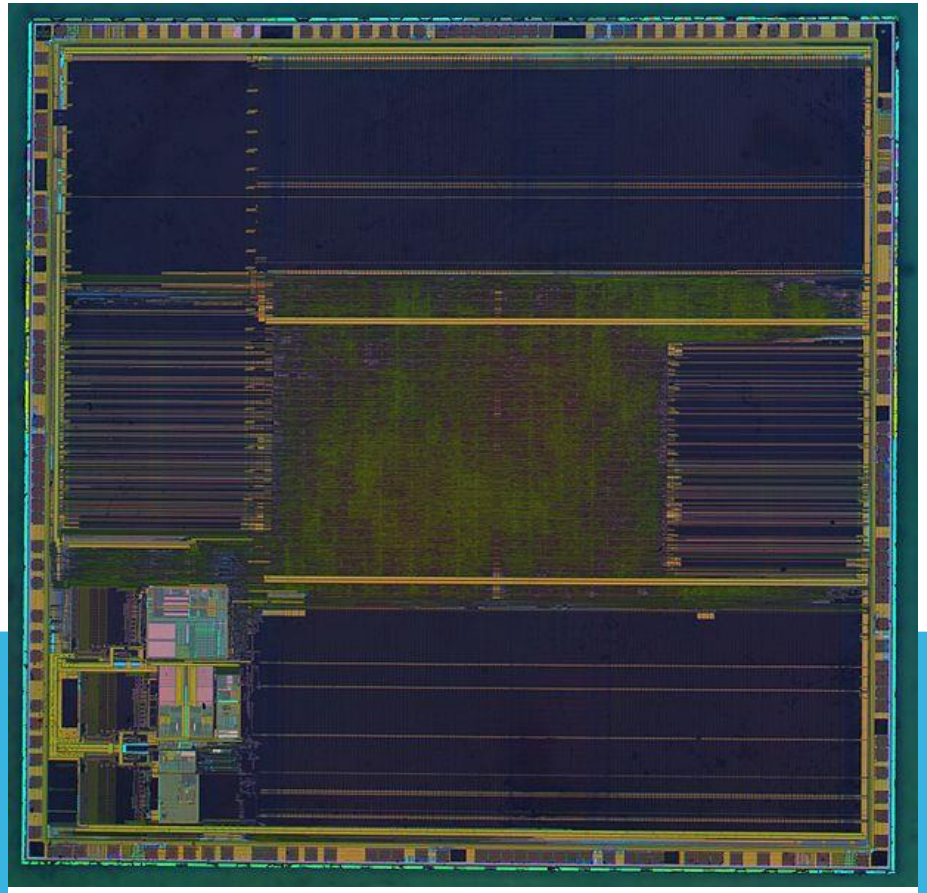
Model A/B:

- Broadcom BCM2835 (ARM CPU & GPU)
- 256/512MB SDRAM
- 1/2 USB 2.0 Ports
- None/Ethernet Port
- HDMI
- Audio
- SD Card Slot
- Micro USB for power



SOBRE ARM (1/2)

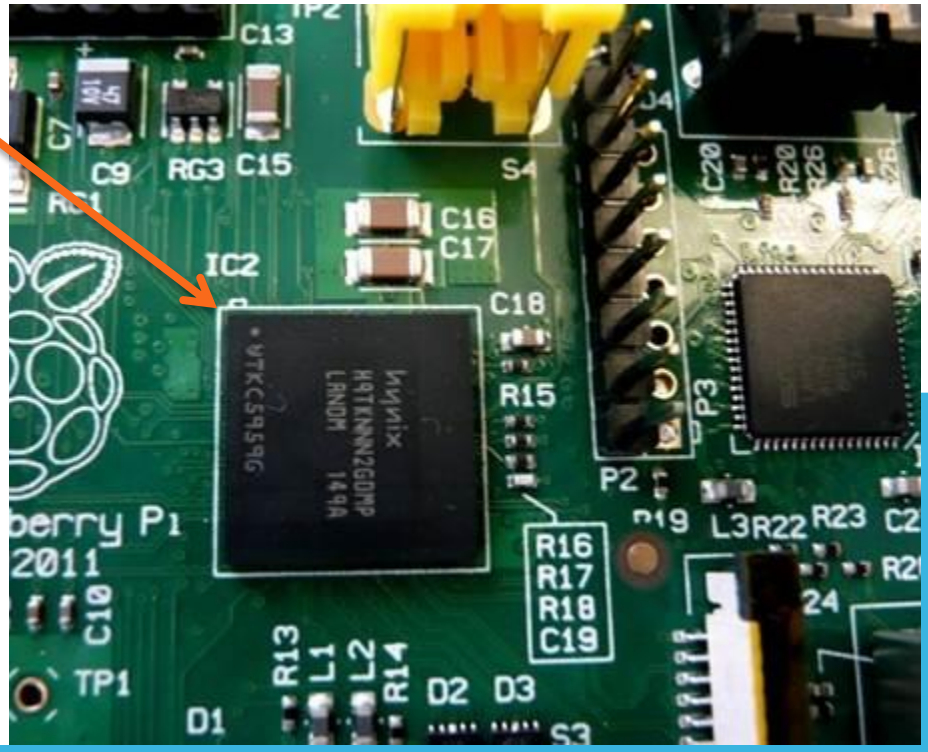
- **ARM** es una **ISA RISC** desarrollada por **ARM Holdings**.
- RISC = Bajo **costo**, Baja **potencia**, Baja **temperatura**.
- **ARM Holdings no fabrica, si no que licencia** las arquitecturas (**IP Cores**) a terceros:
  (Apple, Atmel, Broadcom, Freescale, Nvidia, Qualcomm, Samsung Electronics, ST Microelectronics, Texas Instruments, etc.)
- *"ARM-based chips are found in nearly **60 percent** of the world's mobile devices"*



Die of a STM32F103VGT6 ARM Cortex-M3

SOBRE ARM (2/2)

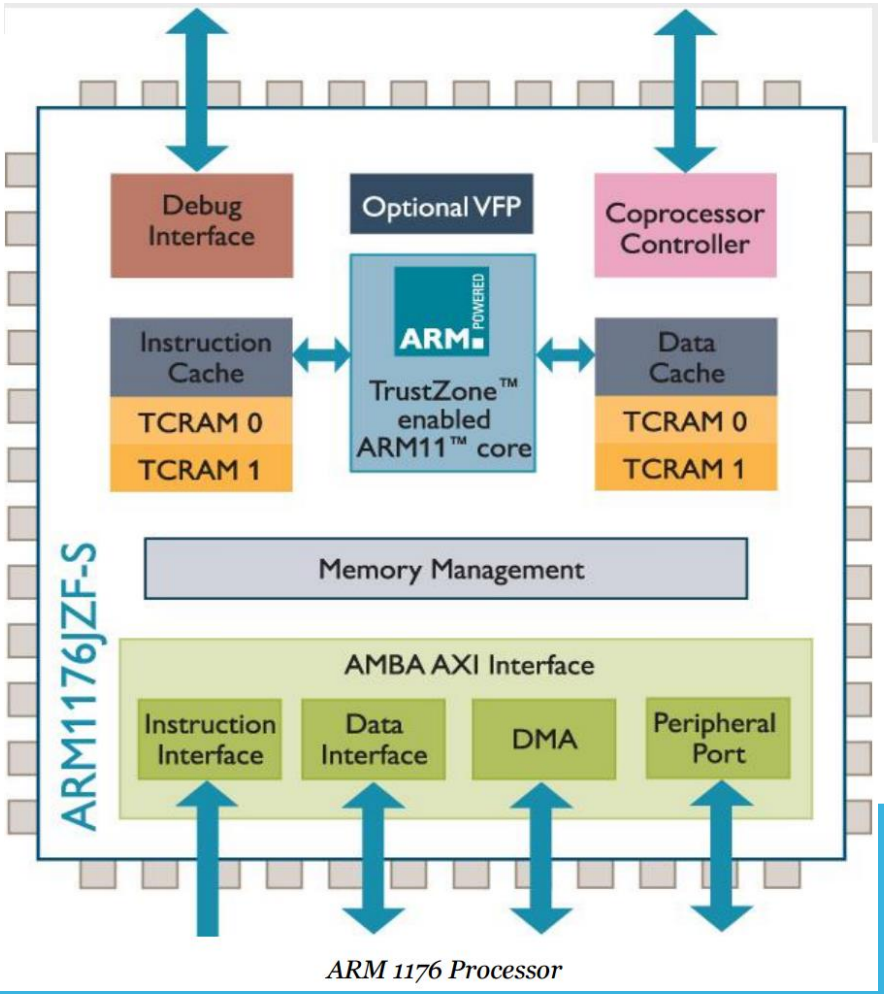
- Hay **varias versiones** de ARM
  - ARMv5: 32 Bits,
  - ARMv6: 32 Bits, FPU - **(ARMv6 ARM1176JZF-S)**
  - ARMv8: 64 Bits, FPU
- Broadcom **BCM2835** es usado por todas las **Rpi**.
- Consumo:
  - 1.5 W (model A)
  - 1.0 W (model A+)
  - 3.5 W (model B)
  - 3.0 W (model B+)



BCM2835: CPU OVERVIEW

ARM11J6JZF-S (ARM11 Family)

- ARMv6 Architecture
- Single Core
- 32-Bit RISC
- 700 MHz Clock Rate
- 8 Pipeline Stages
- Branch Prediction



ARM 1176 Processor

RASPBERRY PI Revision 2 Pinout

http://www.pinballsp.com

		3V3	1	2	5V
I2C PULL-UP		GPIO2 SDA	3	4	5V
		GPIO3 SCL	5	6	Ground
		GPIO4	7	8	GPIO14 TXD
		Ground	9	10	GPIO15 RXD
UART-RTS		GPIO17	11	12	GPIO18
		GPIO27	13	14	Ground
		GPIO22	15	16	GPIO23
		3V3	17	18	GPIO24
SPI		GPIO10 MOSI	19	20	Ground
		GPIO9 MISO	21	22	GPIO25
		GPIO11 CLK	23	24	GPIO8 CE0
		Ground	25	26	GPIO7 CE1

Revision 2.0

+5v

GND

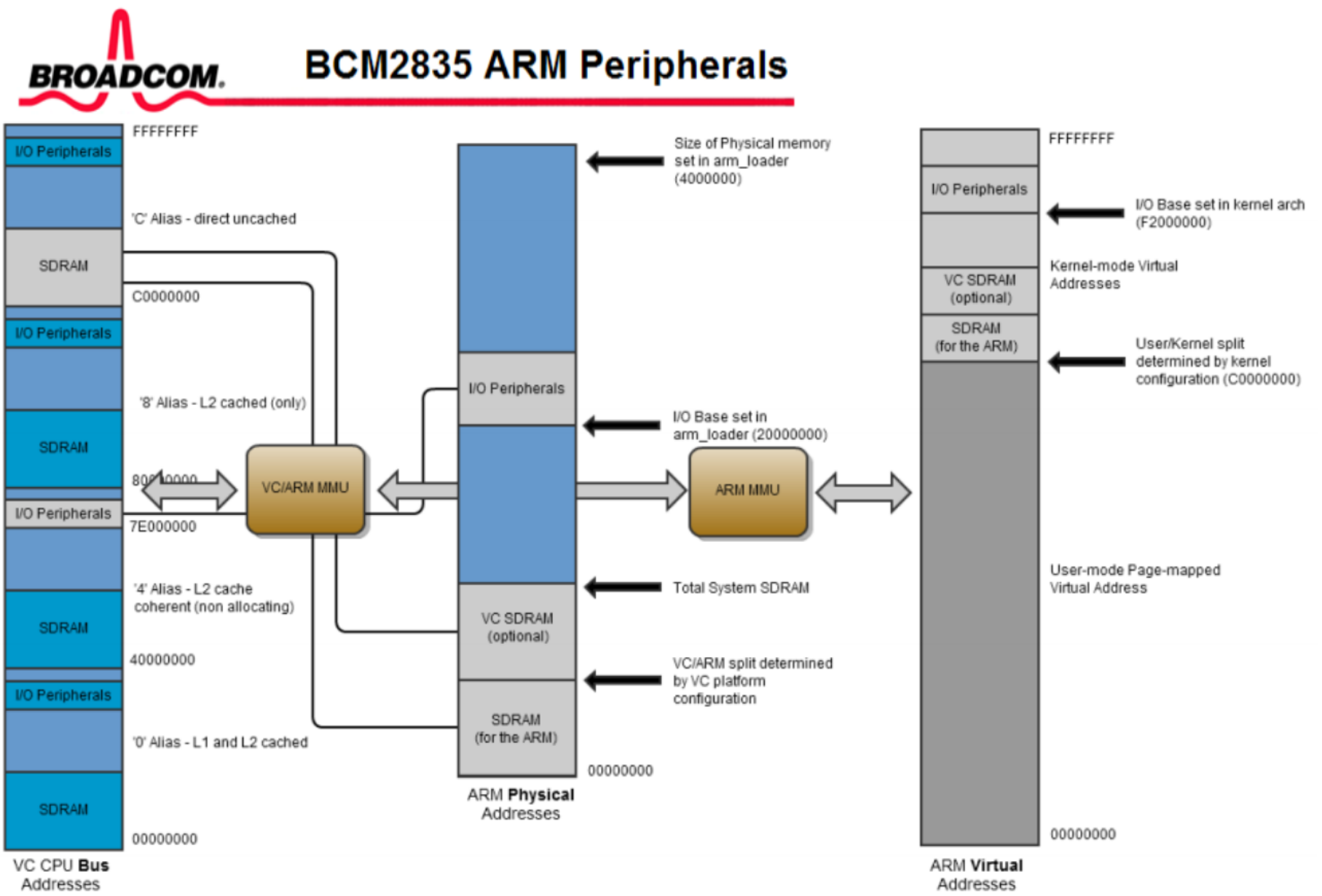
UART

PWM

SPI

https://www.facebook.com/pages/PinballSP/336137879799788

I/O MAP


BROADCOM
BCM2835 ARM Peripherals
FFFFFFFF
I/O Peripherals
'C' Alias - direct uncached
SDRAM
C0000000
I/O Peripherals
'8' Alias - L2 cached (only)
SDRAM
I/O Peripherals
7E000000
'4' Alias - L2 cache coherent (non allocating)
SDRAM
40000000
I/O Peripherals
'0' Alias - L1 and L2 cached
SDRAM
00000000
VC CPU Bus Addresses
VC/ARM MMU
Size of Physical memory set in arm_loader (4000000)
I/O Peripherals
I/O Base set in arm_loader (20000000)
Total System SDRAM
VC SDRAM (optional)
VC/ARM split determined by VC platform configuration
SDRAM (for the ARM)
00000000
ARM Physical Addresses
ARM MMU
FFFFFFFF
I/O Peripherals
I/O Base set in kernel arch (F2000000)
Kernel-mode Virtual Addresses
VC SDRAM (optional)
SDRAM (for the ARM)
User/Kernel split determined by kernel configuration (C0000000)
User-mode Page-mapped Virtual Address
00000000
ARM Virtual Addresses

TUTORIAL

Raspberry-Pi Bare Metal Programming in C

http://www.valvers.com/open-software/raspberry-pi/step01-bare-metal-programming-in-cpt1/