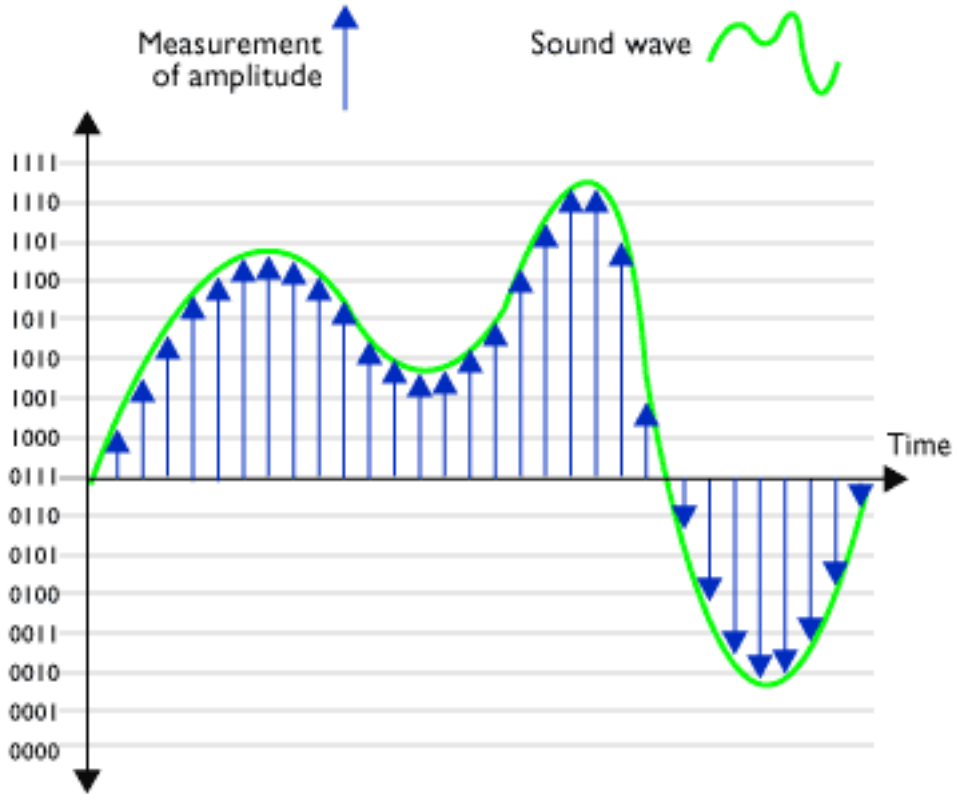
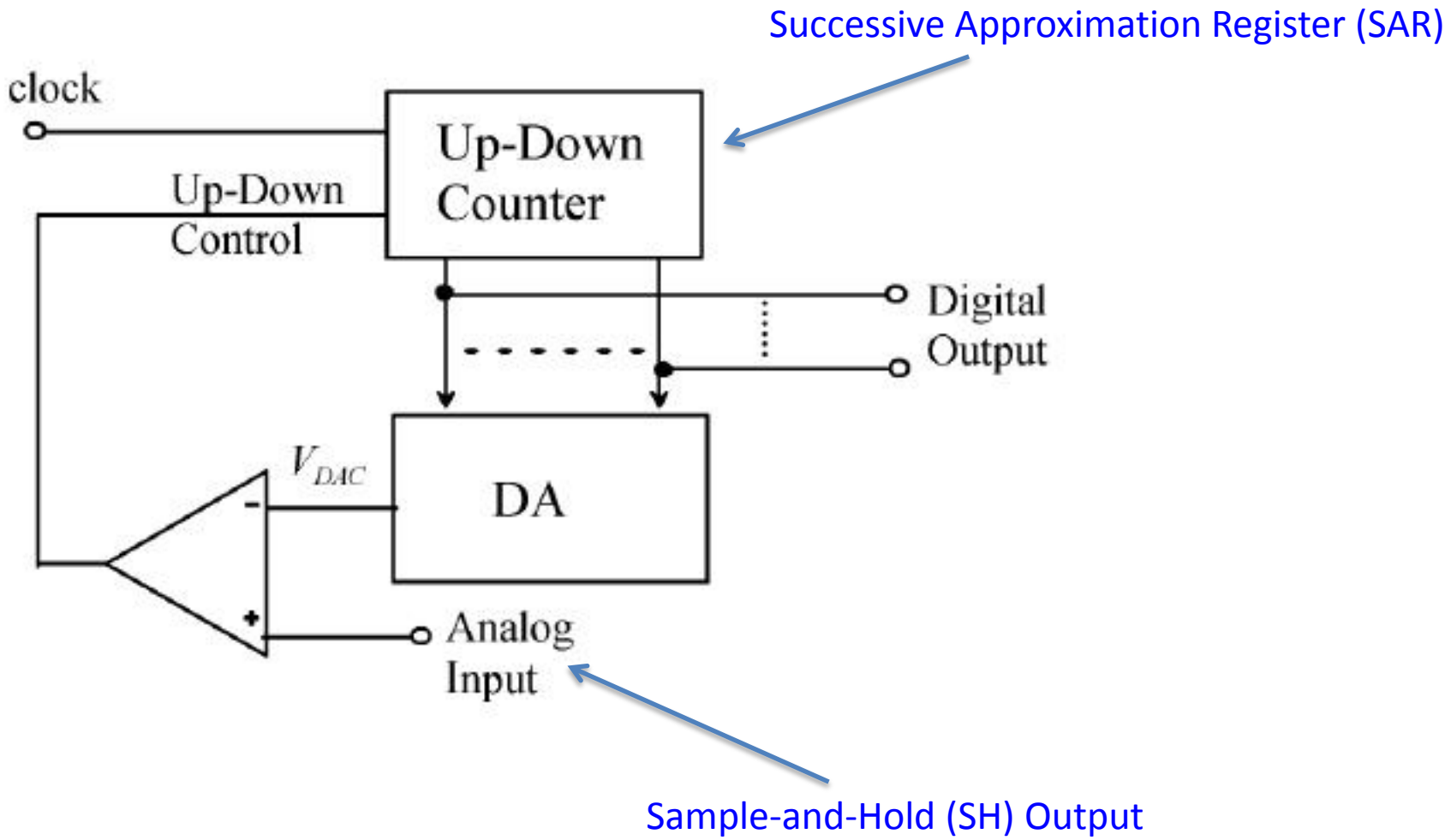
Conversão de Analógico para Digital



Each measurement is assigned a number (byte) according to its amplitude. The end result is a file comprising a string of bytes, eg ...
1001 1110 0001 1010 0111 0100 1111 1101 etc

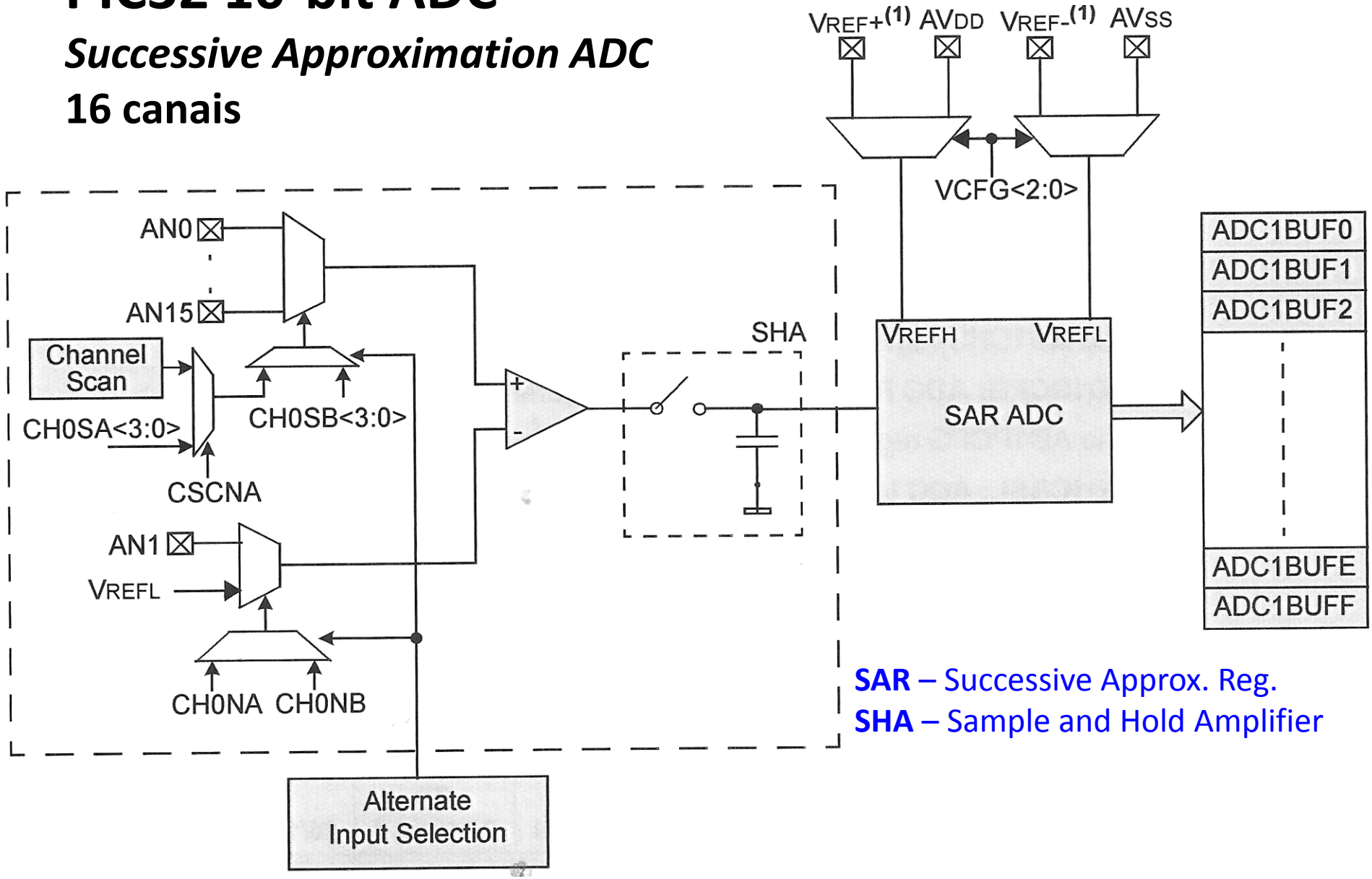
Conversor A/D por aproximações sucessivas



PIC32 10-bit ADC

Successive Approximation ADC

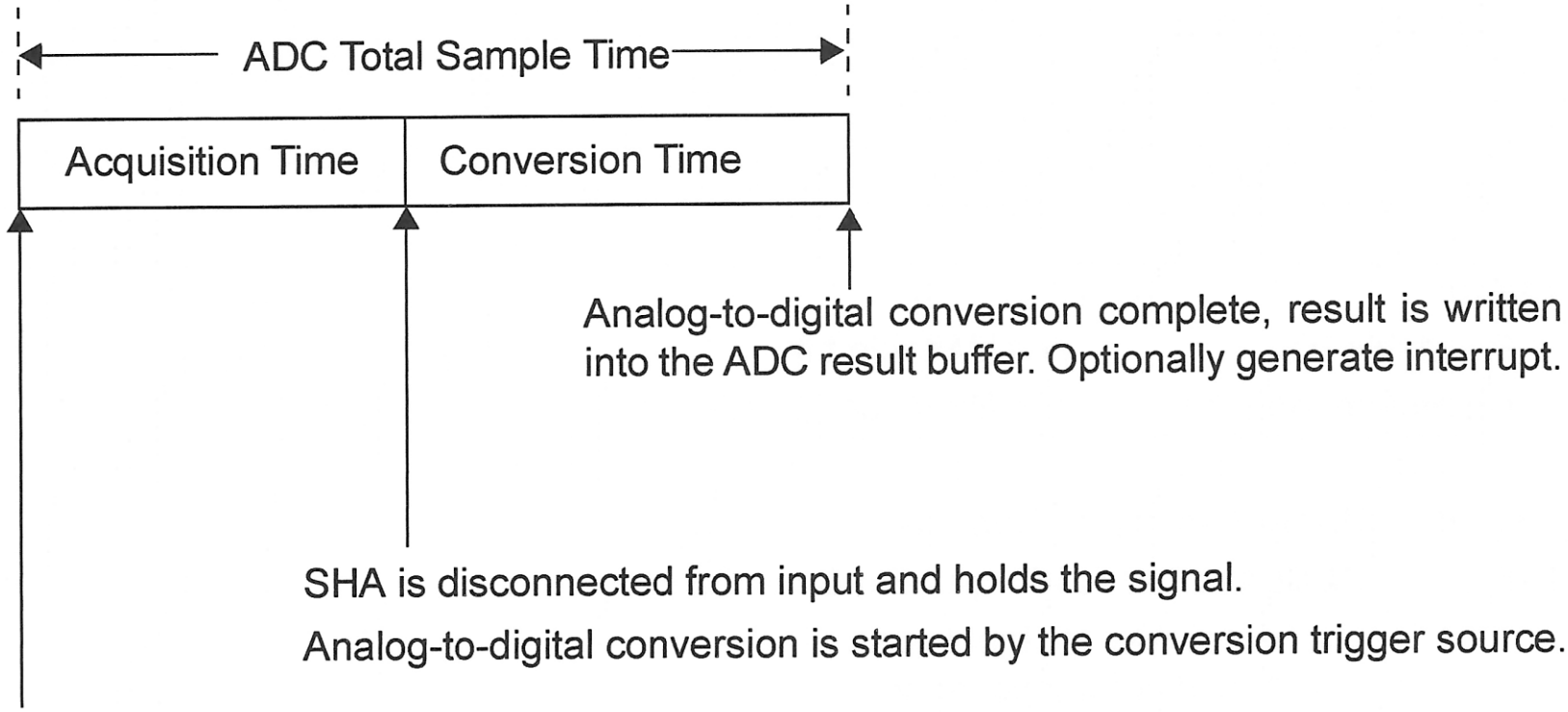
16 canais



SAR – Successive Approx. Reg.

SHA – Sample and Hold Amplifier

ADC Timing



Acquisition Time – automático: determinado por SAMC (AD1CON3<12:8>) ou
manual: SAMP bit (AD1CON1<1>)

Conversion Time – 12 ciclos de relógio

Amostragem pode ser feita uma única vez, periodicamente ou desencadeada por um *trigger*

Registos de Controle da ADC

- **AD1CON1: ADC Control Register 1**
- **AD1CON2: ADC Control Register 2**
- **AD1CON3: ADC Control Register 3**

  The AD1CON1, AD1CON2 and AD1CON3 registers control the operation of the ADC module.

- **AD1CHS: ADC Input Select Register**

  The AD1CHS register selects the input pins to be connected to the SHA.

- **AD1PCFG: ADC Port Configuration Register(1,2)**

  The AD1PCFG register configures the analog input pins as analog inputs or as digital I/O.

- **AD1CSSL: ADC Input Scan Select Register(1)**

  The AD1CSSL register selects inputs to be sequentially scanned.

1. Configure the analog port pins in AD1PCFG<15:0> (see 17.4.1).
2. Select the analog inputs to the ADC multiplexers in AD1CHS<32:0> (see 17.4.2).
3. Select the format of the ADC result using FORM<2:0> (AD1CON1<10:8>) (see 17.4.3).
4. Select the sample clock source using SSRC<2:0> (AD1CON1<7:5>) (see 17.4.4).
5. Select the voltage reference source using VCFG<2:0> (AD1CON2<15:13>) (see 17.4.7).
6. Select the Scan mode using CSCNA (AD1CON2<10>) (see 17.4.8).
7. Set the number of conversions per interrupt SMP<3:0> (AD1CON2<5:2>), if interrupts are to be used (see 17.4.9).
8. Set Buffer Fill mode using BUFM (AD1CON2<1>) (see 17.4.10).
9. Select the MUX to be connected to the ADC in ALTS AD1CON2<0> (see 17.4.11).
10. Select the ADC clock source using ADRC (AD1CON3<15>) (see 17.4.12).
11. Select the sample time using SAMC<4:0> (AD1CON3<12:8>), if auto-convert is to be used (see 17-2).
12. Select the ADC clock prescaler using ADCS<7:0> (AD1CON3<7:0>) (see 17.4.12).
13. Turn the ADC module on using AD1CON1<15> (see 17.4.14).

Note: Steps 1 through 12, above, can be performed in any order, but Step 13 must be the final step in every case.

14. To configure ADC interrupt (if required):
    a) Clear the AD1IF bit (IFS1<1>) (see 17.7).
    b) Select ADC interrupt priority AD1IP<2:0> (IPC<28:26>) and subpriority AD1IS<1:0> (IPC<24:24>) if interrupts are to be used (see 17.7).
15. Start the conversion sequence by initiating sampling (see 17.4.15).