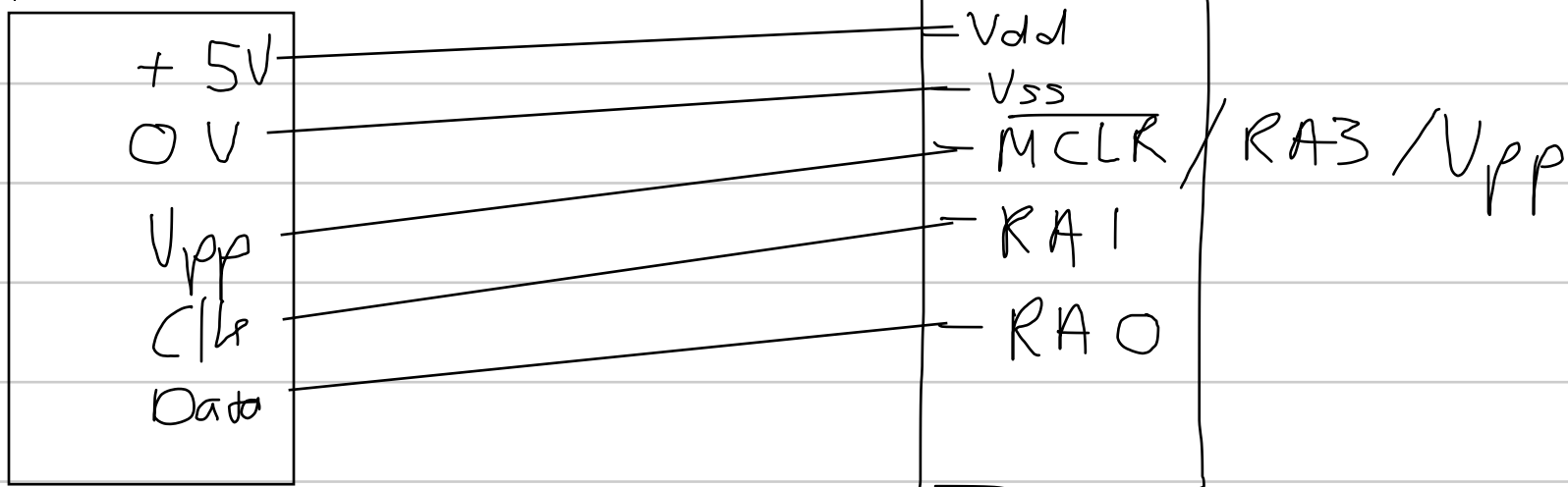


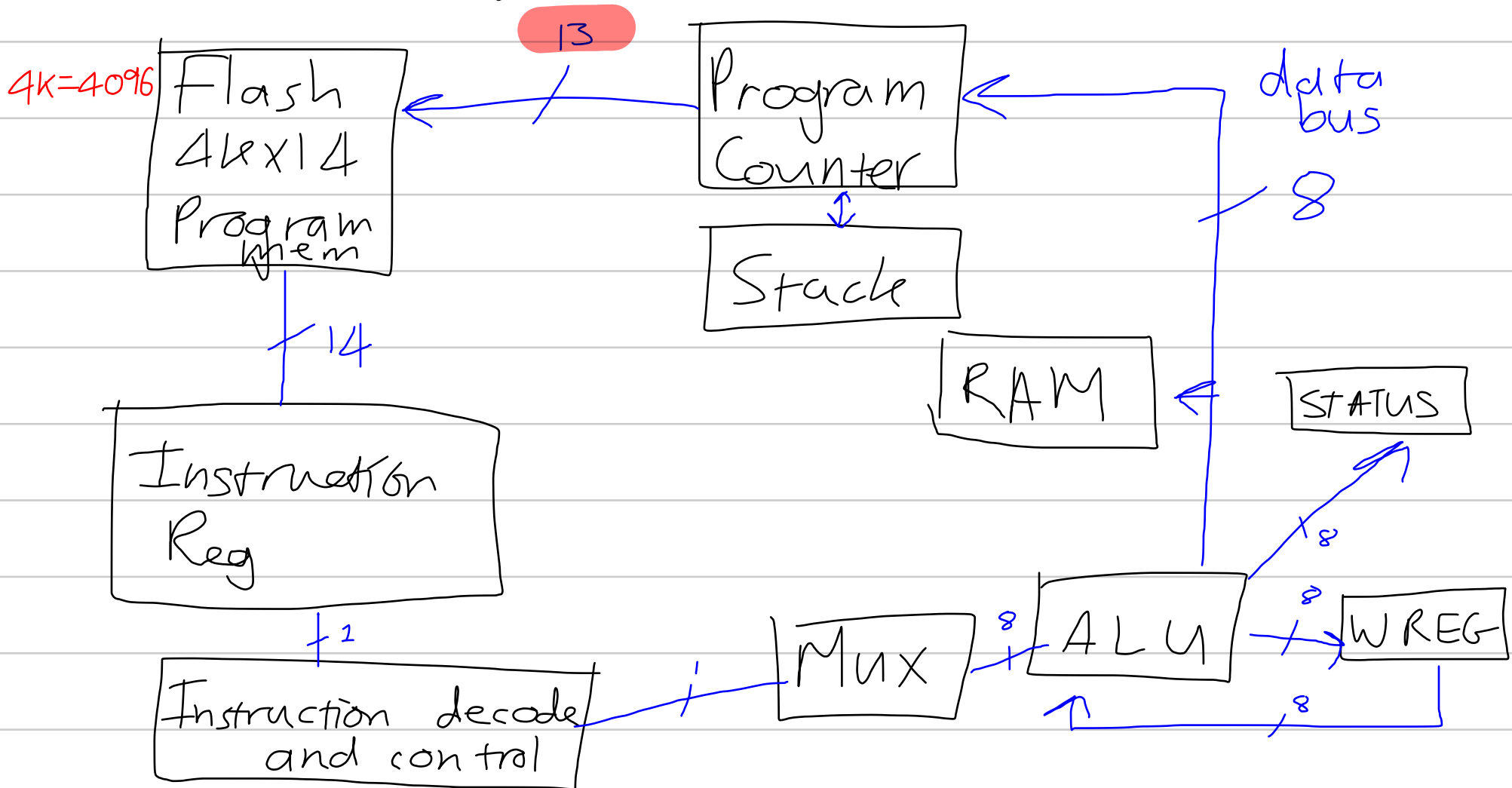
In-circuit serial programming

Pickit 3

16F690



1. Specially programmed while in circuit
2. Gives application flexibility
3. Chip into program mode by holding RA0 and RA1 low with Vpp from V_{il} to V_{ih}
4. Program counter (PC) goes to 0x00.



1.1. Binary addition

$$10_2 + 10_2 = \begin{array}{r} 10 \quad Q1 \\ + 10 \quad +Q1 \\ \hline 100_2 = 4_{10} \quad (Q2) \\ 00 \quad (Q1) + \text{carry bit} \end{array}$$

101101 + 011 in Q5.2

101101

+ 011

110000 Q5

110000.00 Q5.2

Example

13.2₁₀ + 7.85₁₀ (in binary)

$$13.2_{10} =$$

$$1101.0011001$$

$$= 13.195_{10} \quad Q3.7$$

$$7.85_{10} =$$

$$+ 0111.1101100$$

$$= 7.84375_{10} \quad Q3.7$$

$$10101.0000101$$

$$= 21.0391_{10} \quad Q4.7$$

Absolute error = Reality - Approx

$$13.2 - 13.195 = 0.005 \quad (> 2^{-7}?)$$

$$7.85 - 7.84375 = 0.00625 \quad (> 2^{-7}; > 2^{-8}?) \quad 2^{-(m-1)}$$

Relative error = $\frac{\text{Absolute error}}{\text{Reality}}$

$$\frac{0.005}{13.2} = 0.038\%$$

$$\frac{0.00625}{7.85} = 0.08\%$$