

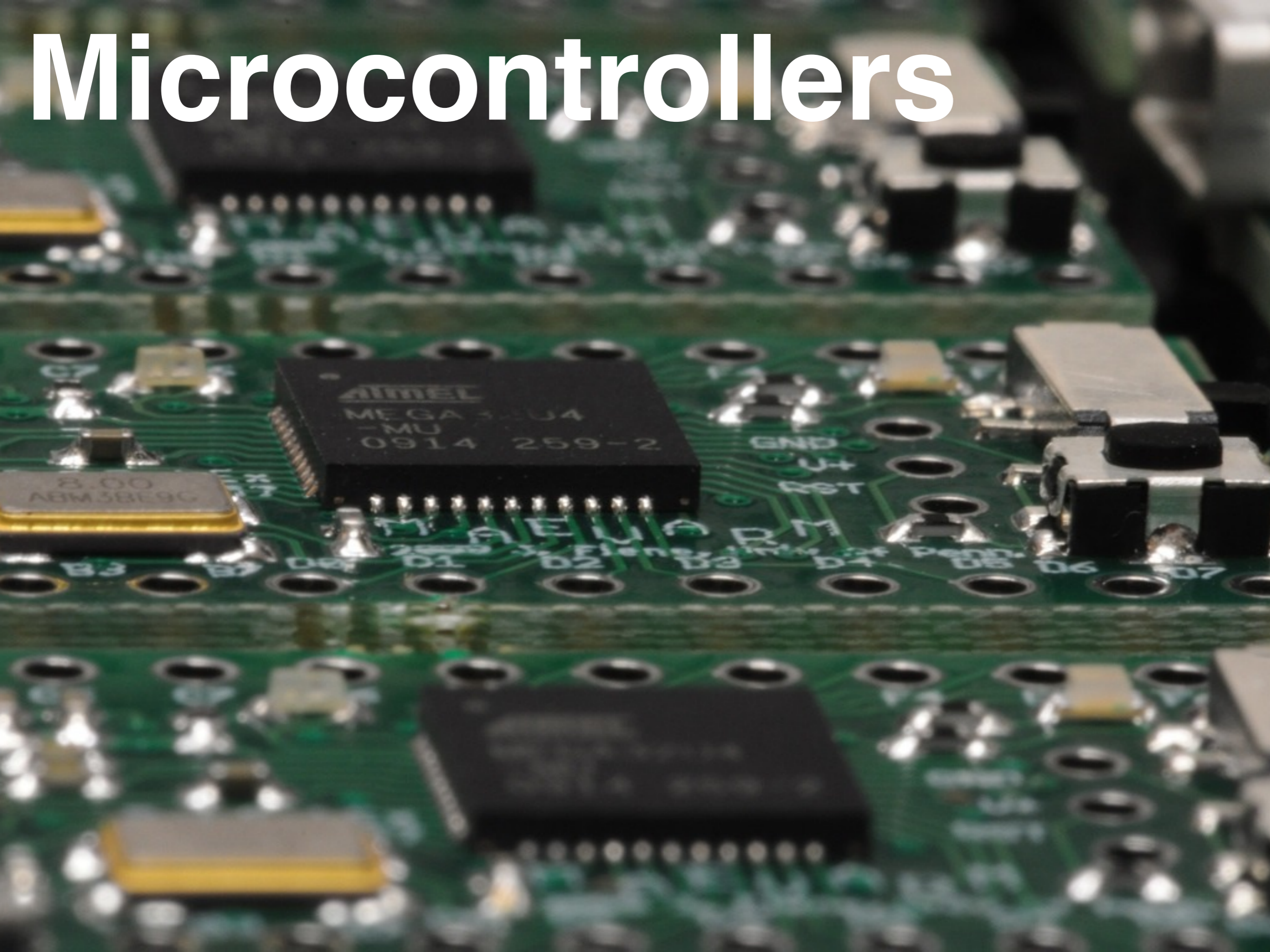
ROBOTICS

SAAST

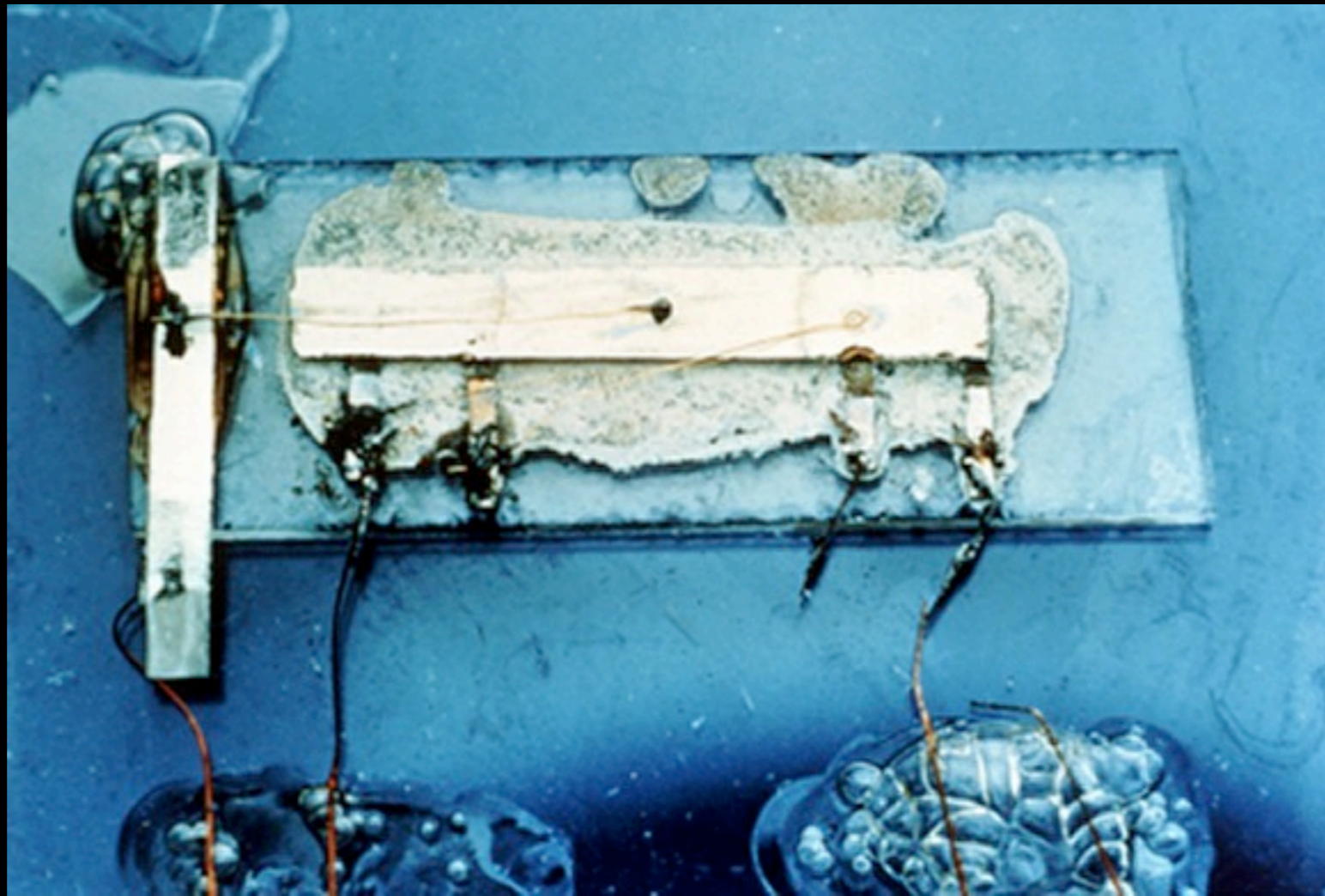


Embedded Computing

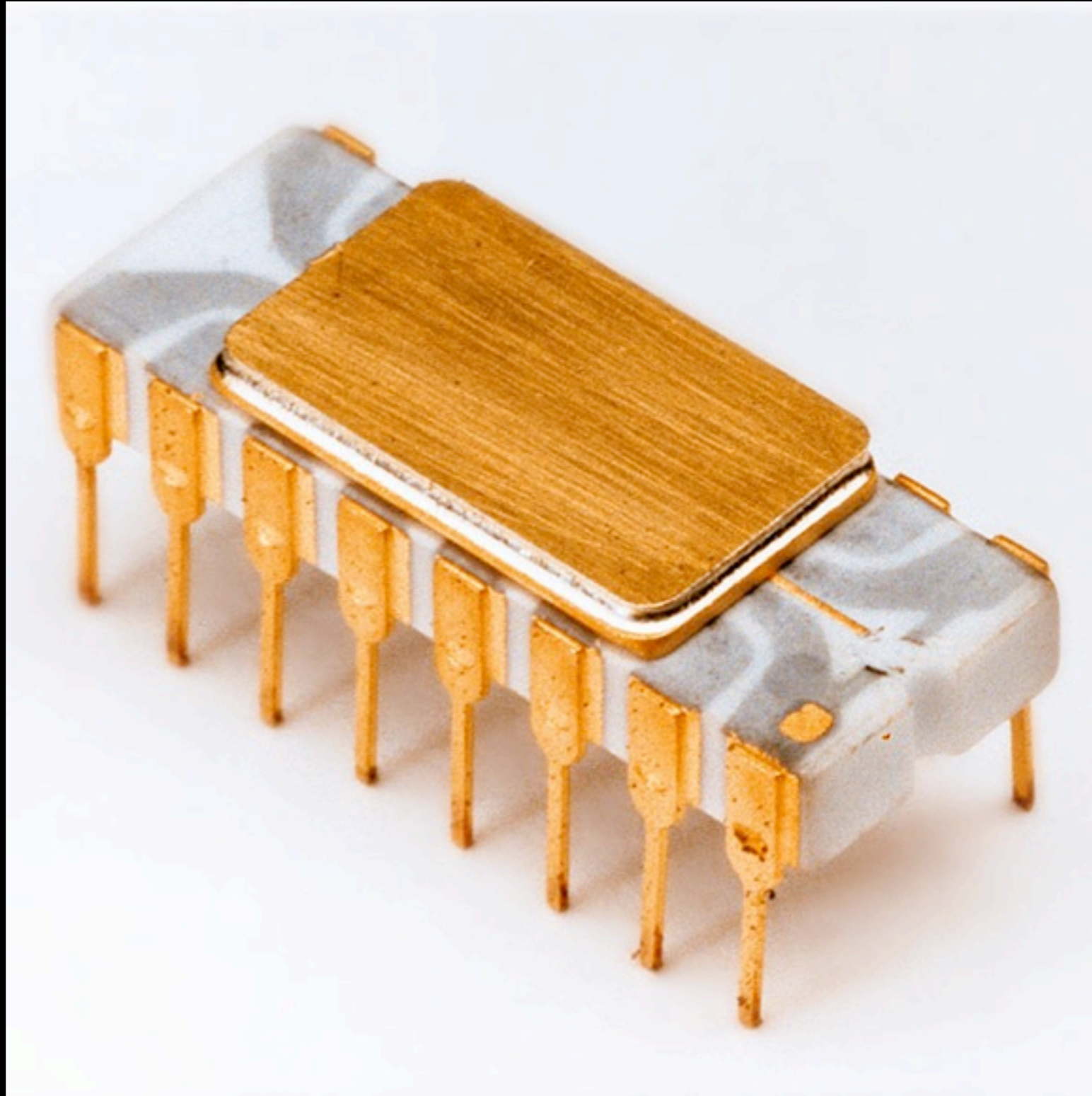
Microcontrollers



Integrated Circuits in 1958



The first single-chip microprocessor, circa 1971

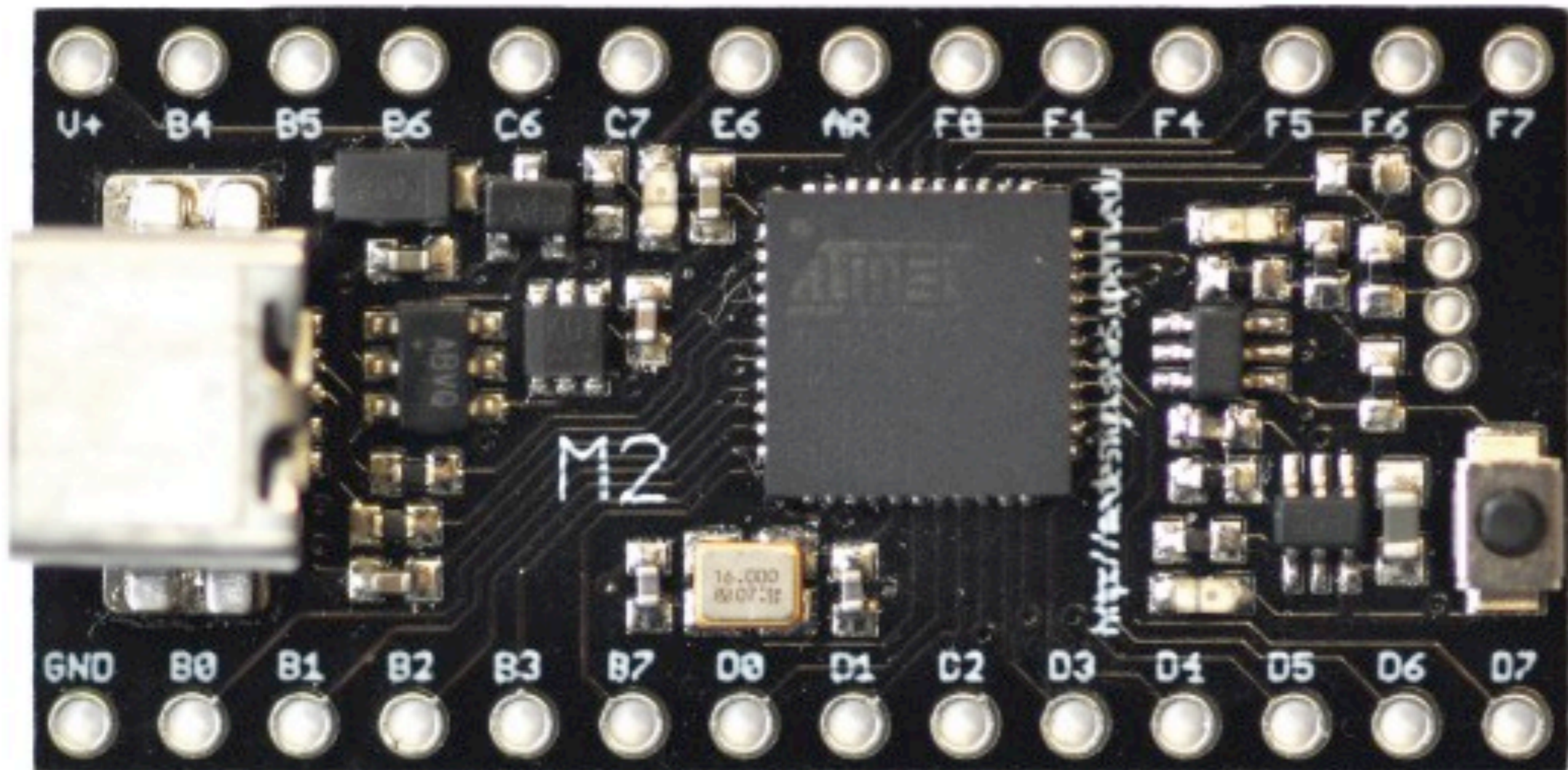


(Intel 4004: 740kHz, 4-bit, 4KB cache, 2,300 transistors)

microprocessors, circa 2011



(Intel Gulftown Six-core processor - 1.17B transistors)



m2





28-pin DIP

8-bit Atmel ATmega32U4 processor

16 MHz clock

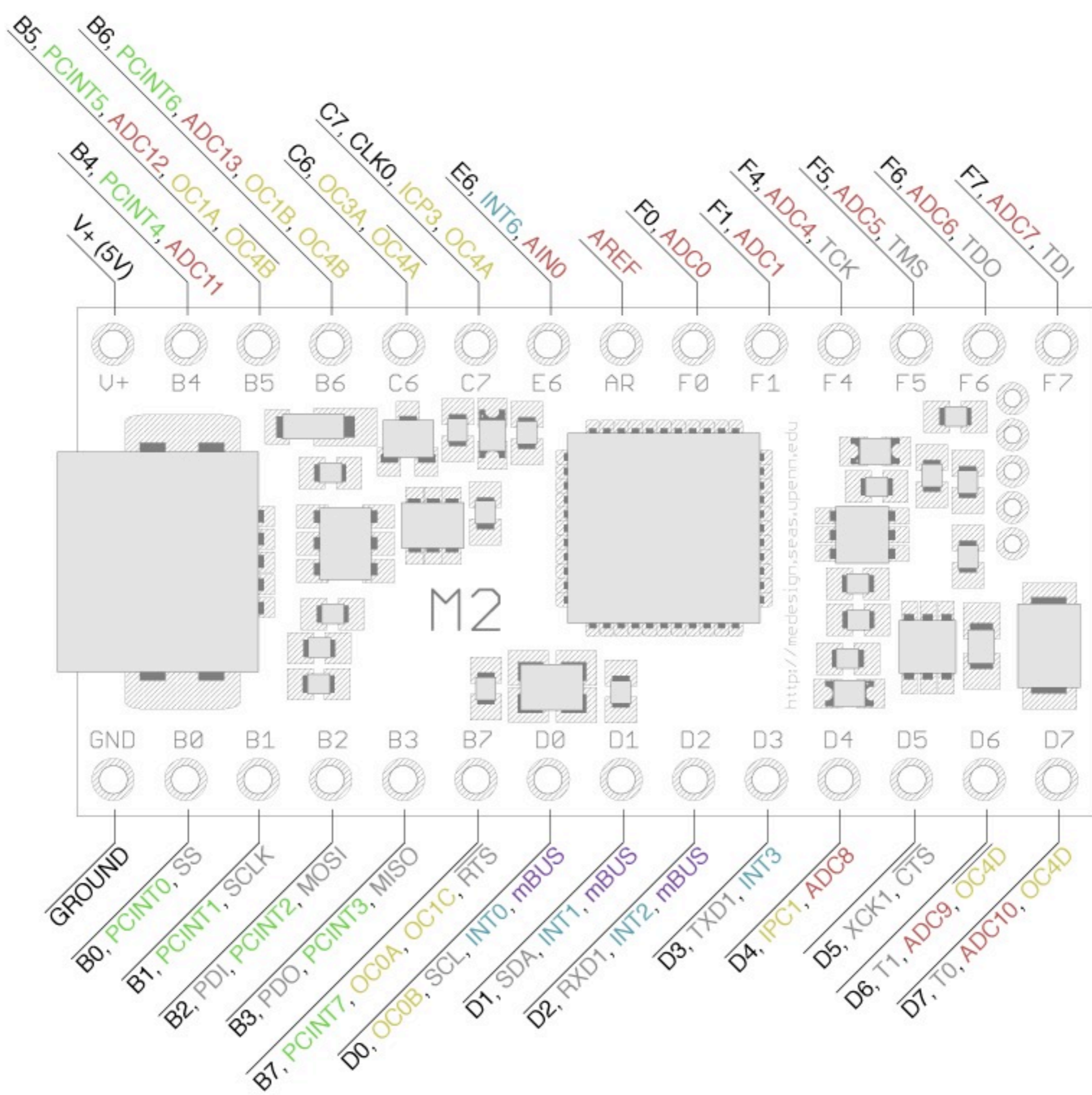
25 I/O pins

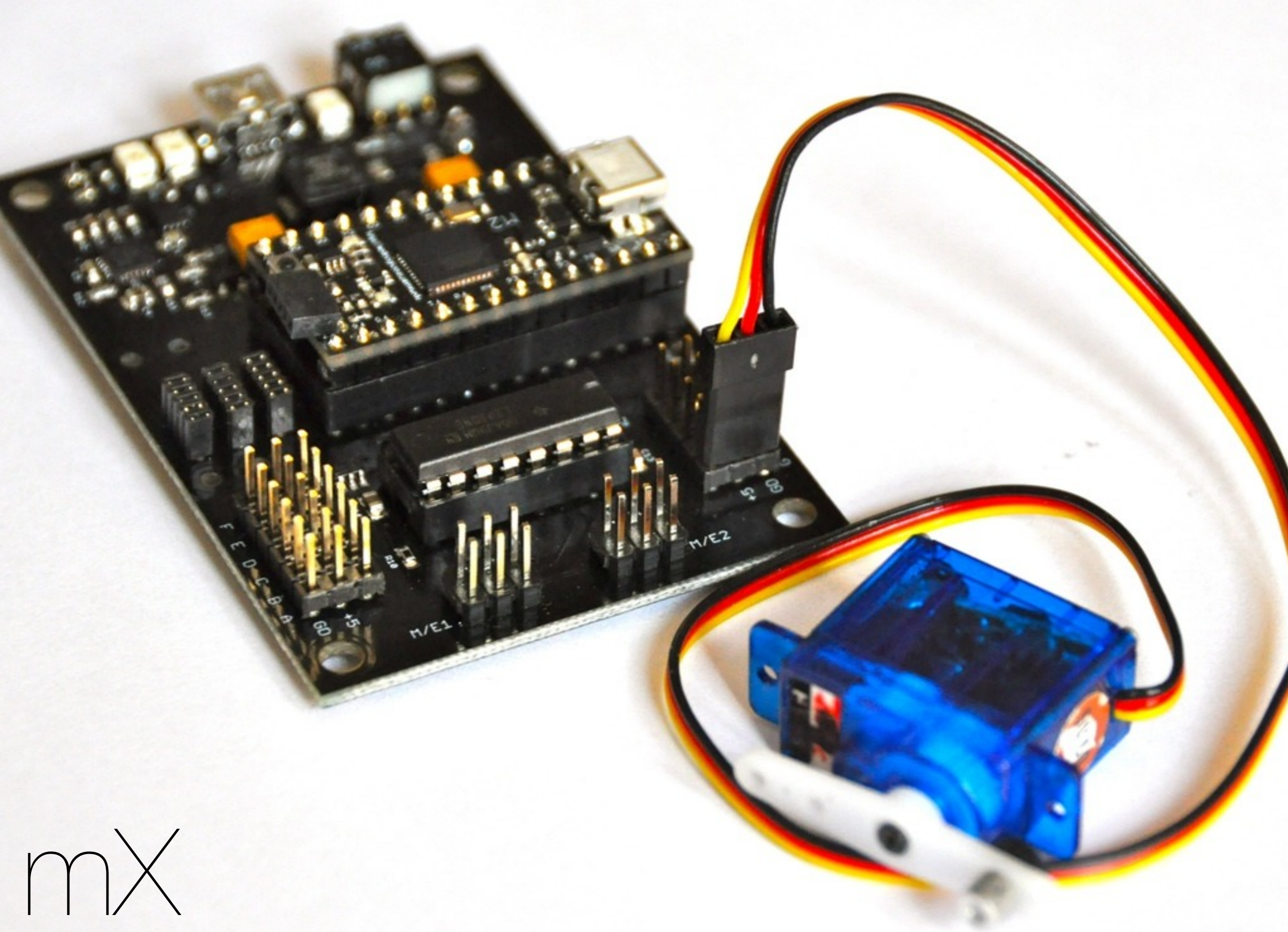
12 channel 10-bit ADC

32k Flash, 1k EEPROM, 2.5k SRAM

4 independent timers with PWM

USART, I2C, SPI, JTAG, USB





mX

