Common Addressing Modes

Op	data type	mode	reg	addr/data/offset

opcode(O) reg (R) address (D)

Mode	meaning
immediate	Operand = D
direct	Operand = M[D]
Register indirect Memory indirect	Operand = M[R] Operand = M[M[D]]
Auto-increment	Operand = M[R] R = R + n (n=1|2|4|8)
Auto-decrement	R = R – n (n = 1|2|4|8) Operand = M[R]
Indexed Scale-index-base (SIB)	Operand = M[R+D] Operand = M[s * R+D]
PC-relative	Operand = M[PC+D]
SP-relative	Operand = M[SP+D]

(Note: R = content of register R)

Question: Why so many addressing modes? Do we need all?