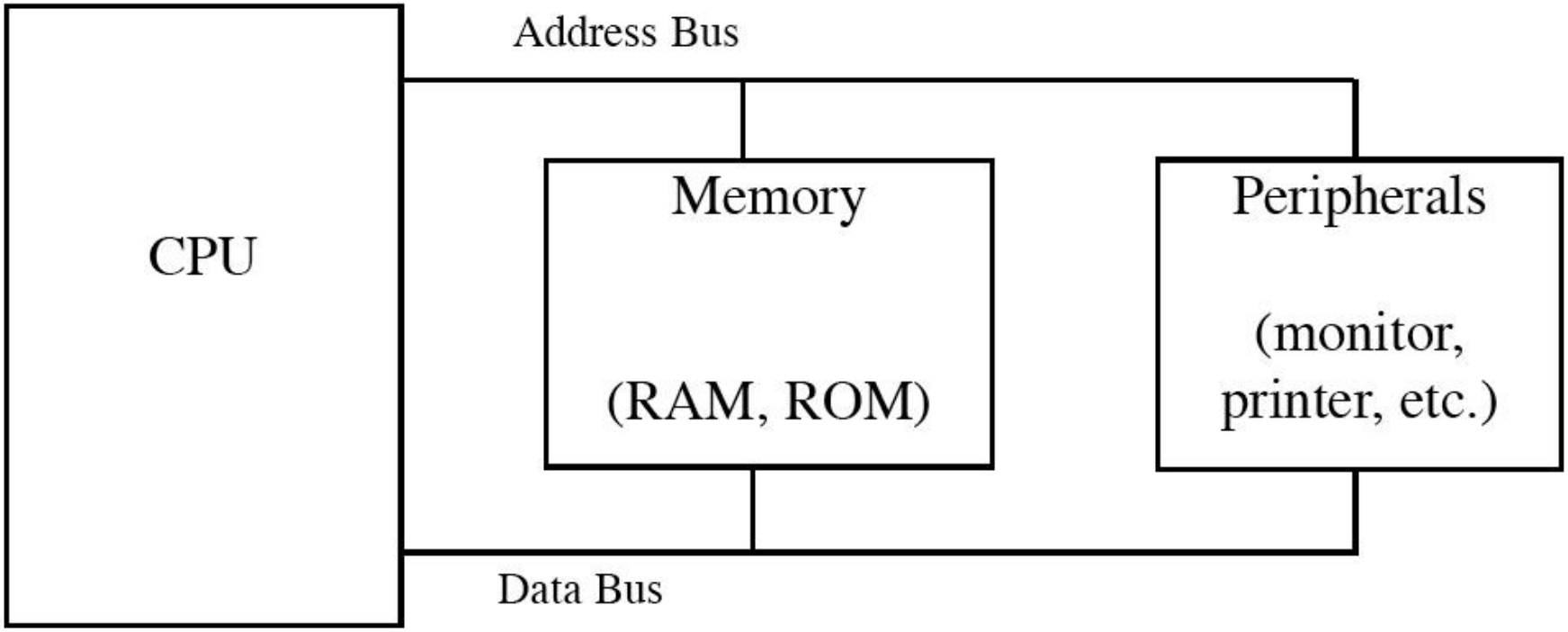
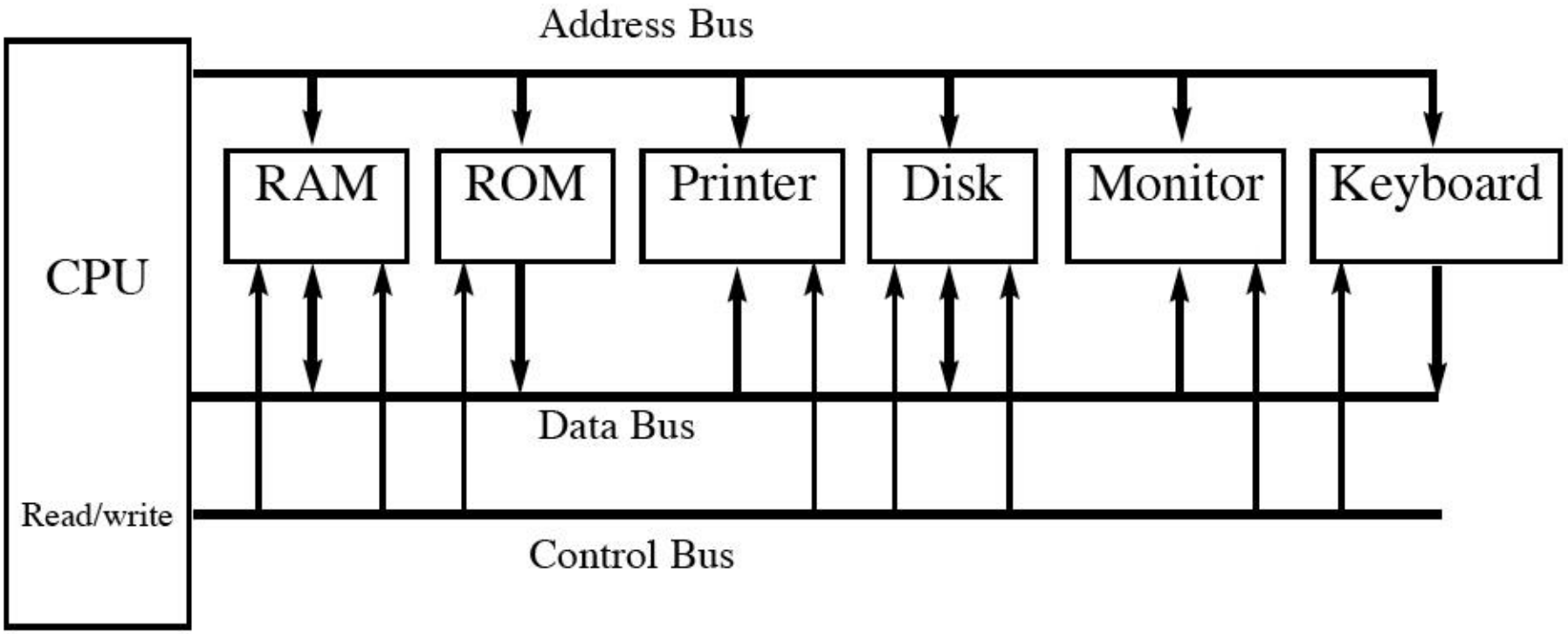
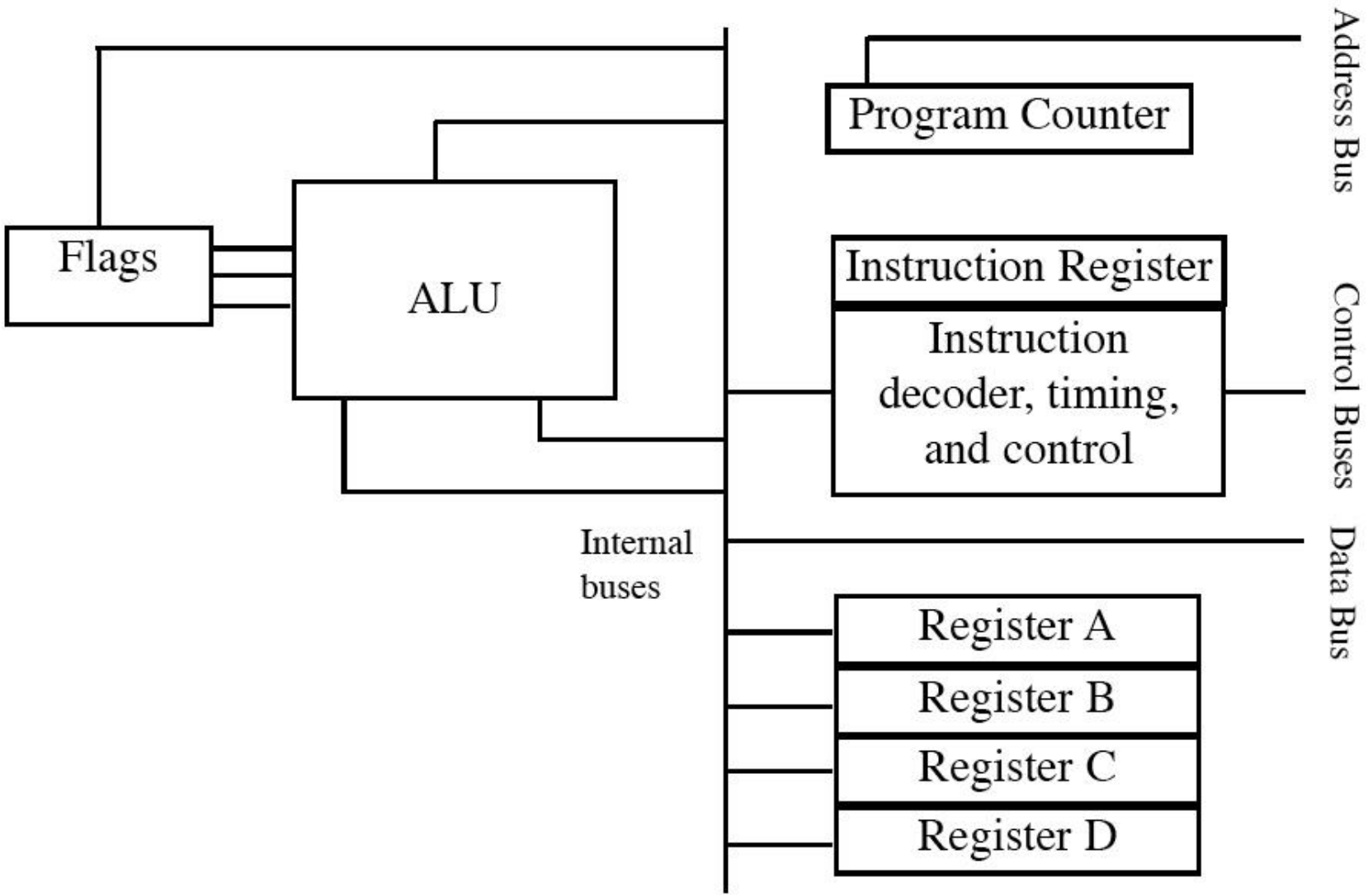
Basic Computer Organization



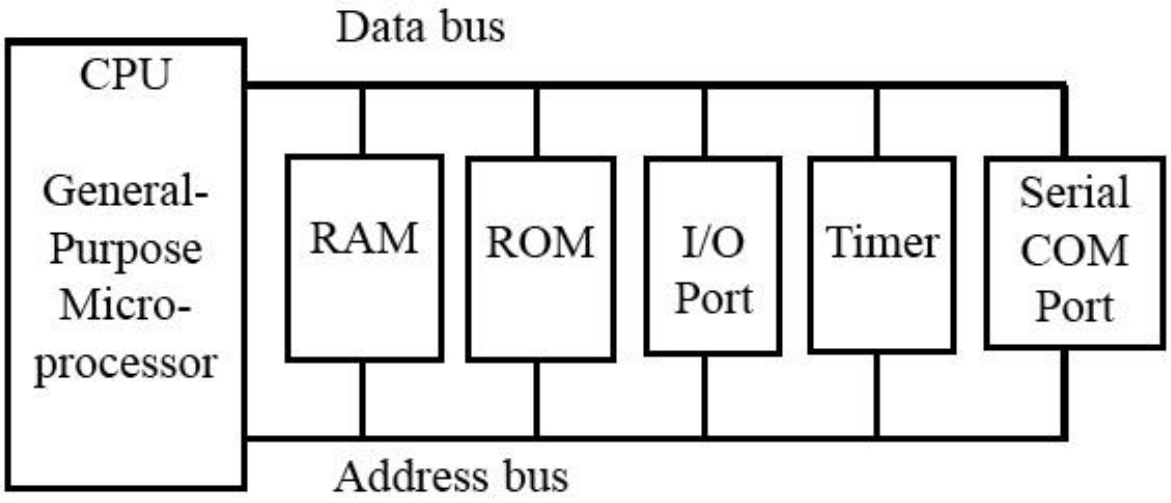
Internal Organization of Computers with Peripherals



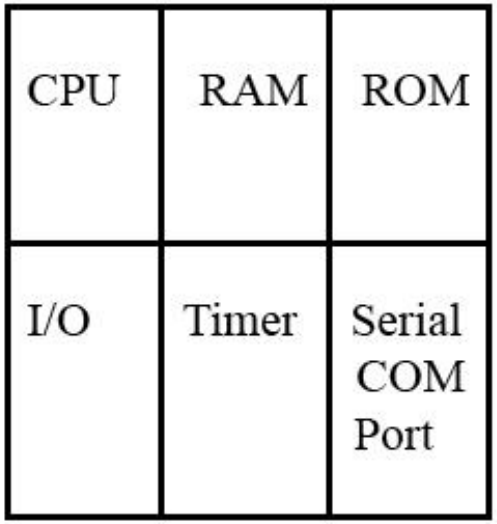
Internal Block Diagram of a CPU



Microprocessor System Contrasted Vs Microcontroller System

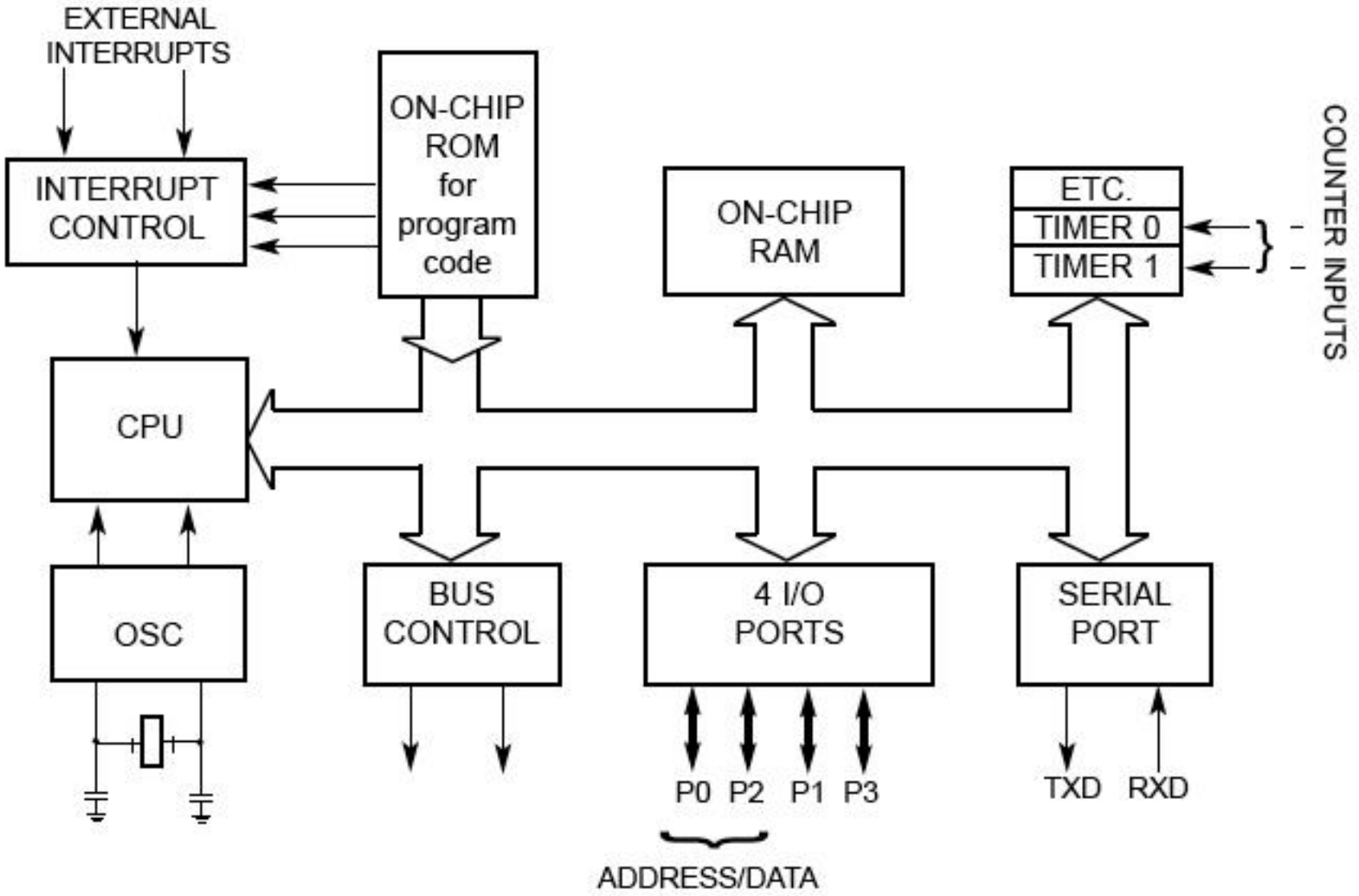


(a) General-Purpose Microprocessor System



(b) Microcontroller

Inside the 8051 Microcontroller Block Diagram



Examples

Feature	8051	8052	8031
ROM (on-chip program space in bytes)	4K	8K	0K
RAM (bytes)	128	256	128
Timers	2	3	2
I/O pins	32	32	32
Serial port	1	1	1
Interrupt sources	6	8	6

Part Number	ROM	RAM	I/O pins	Timer	Interrupt	V_{CC}	Packaging
AT89C51	4K	128	32	2	6	5V	40
AT89LV51	4K	128	32	2	6	3V	40
AT89C1051	1K	64	15	1	3	3V	20
AT89C2051	2K	128	15	2	6	3V	20
AT89C52	8K	128	32	3	8	5V	40
AT89LV52	8K	128	32	3	8	3V	40

Note: "C" in the part number indicates CMOS.

Memory Organisation

Registers As a Memory

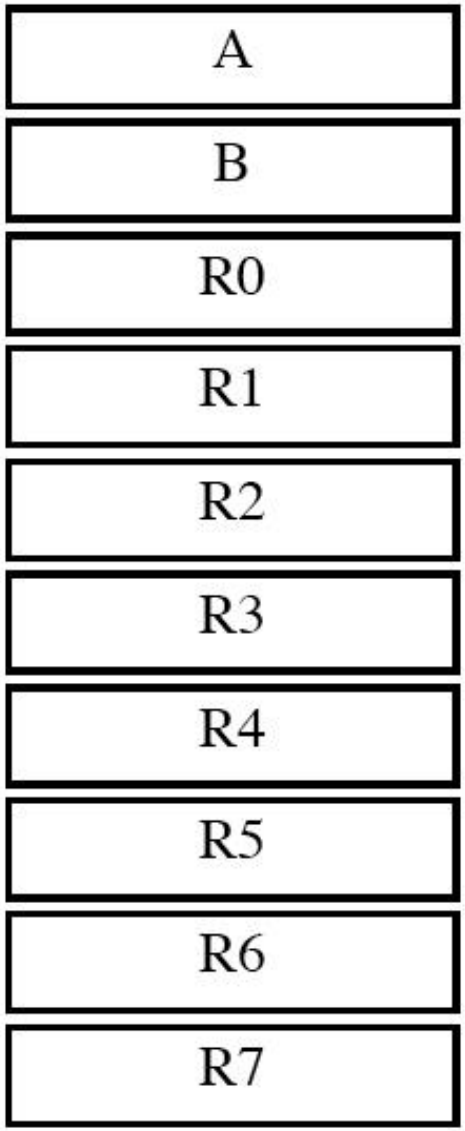
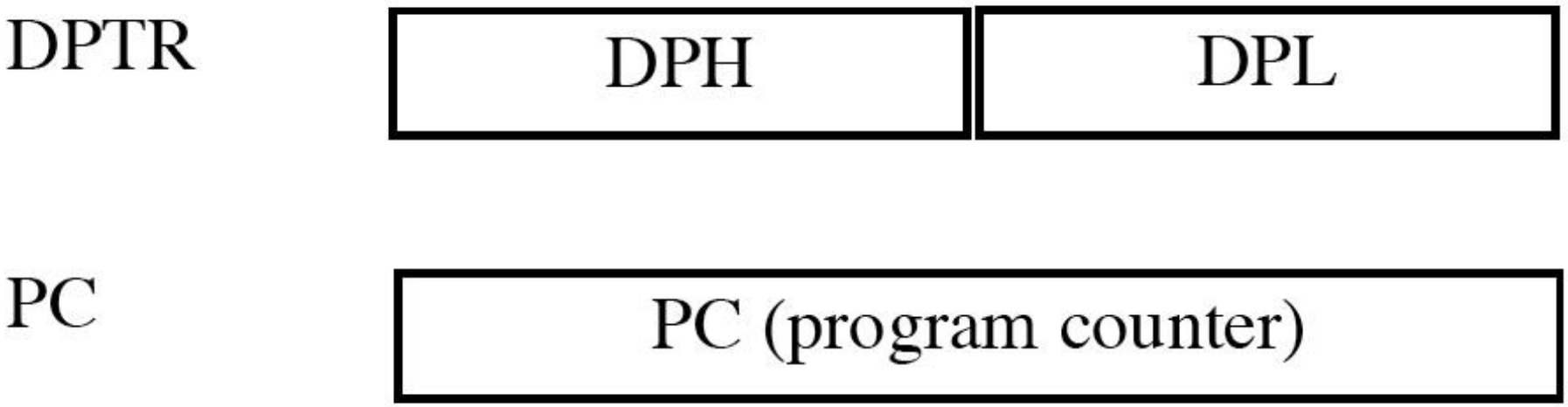
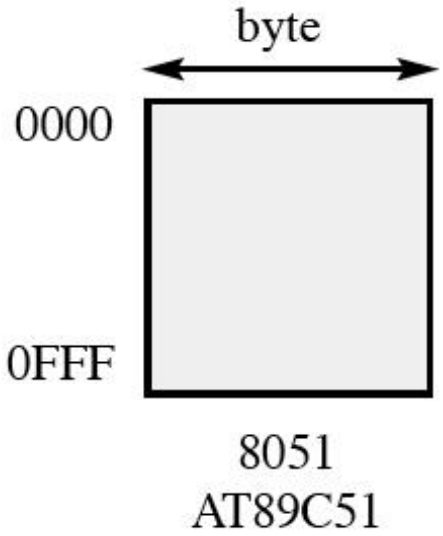
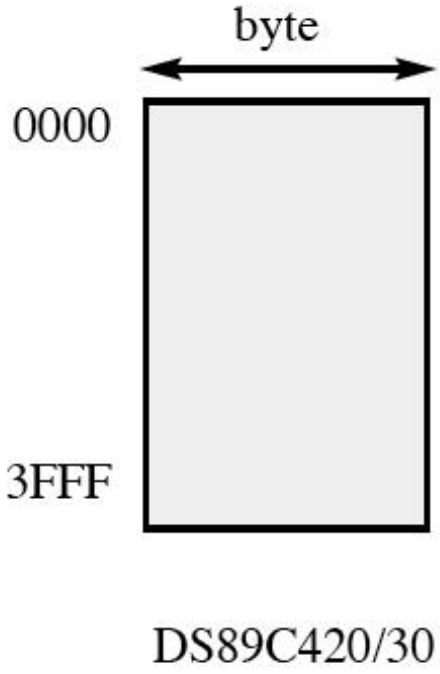


Figure 2–1b Some 8051 16-bit Registers



Address Range -ROM





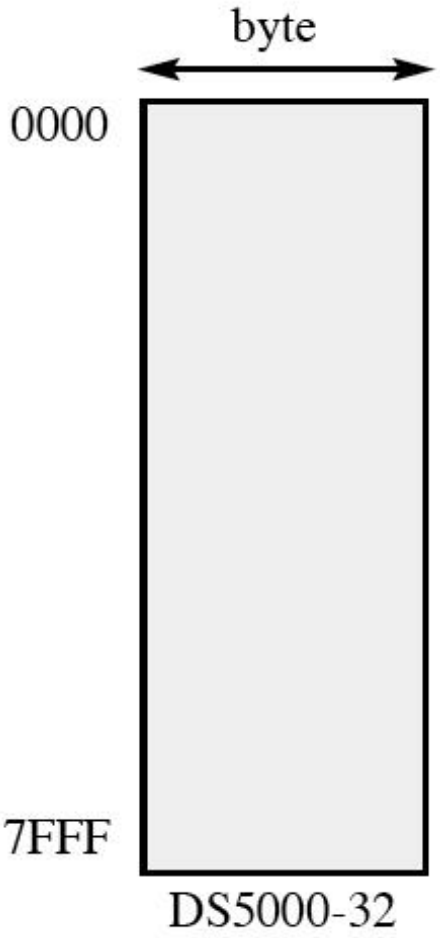
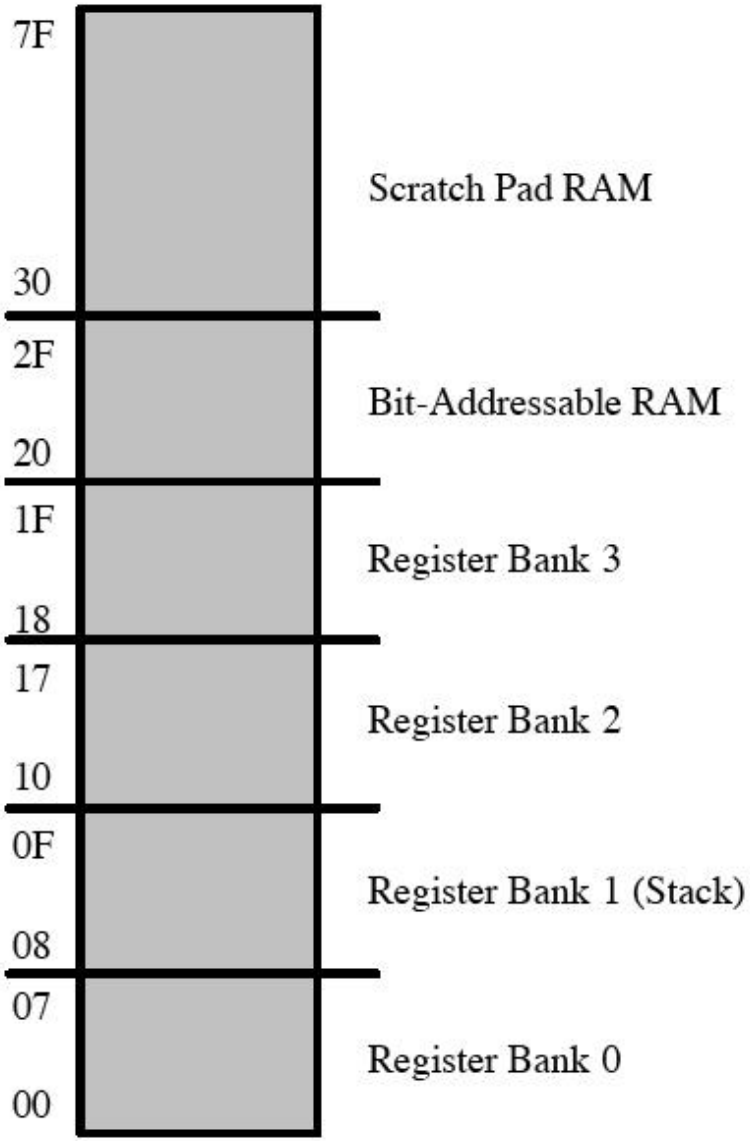


Figure 2–4 Bits of the PSW Register

CY	PSW.7	Carry flag.
AC	PSW.6	Auxiliary carry flag.
F0	PSW.5	Available to the user for general purpose.
RS1	PSW.4	Register Bank selector bit 1.
RS0	PSW.3	Register Bank selector bit 0.
OV	PSW.2	Overflow flag.
--	PSW.1	User-definable bit.
P	PSW.0	Parity flag. Set/cleared by hardware each instuction cycle to indicate an odd/even number of 1 bits in the accumulator.

RS1	RS0	Register Bank	Address
0	0	0	00H - 07H
0	1	1	08H - 0FH
1	0	2	10H - 17H
1	1	3	18H - 1FH

RAM Organization



Register Banks and their RAM Addresses

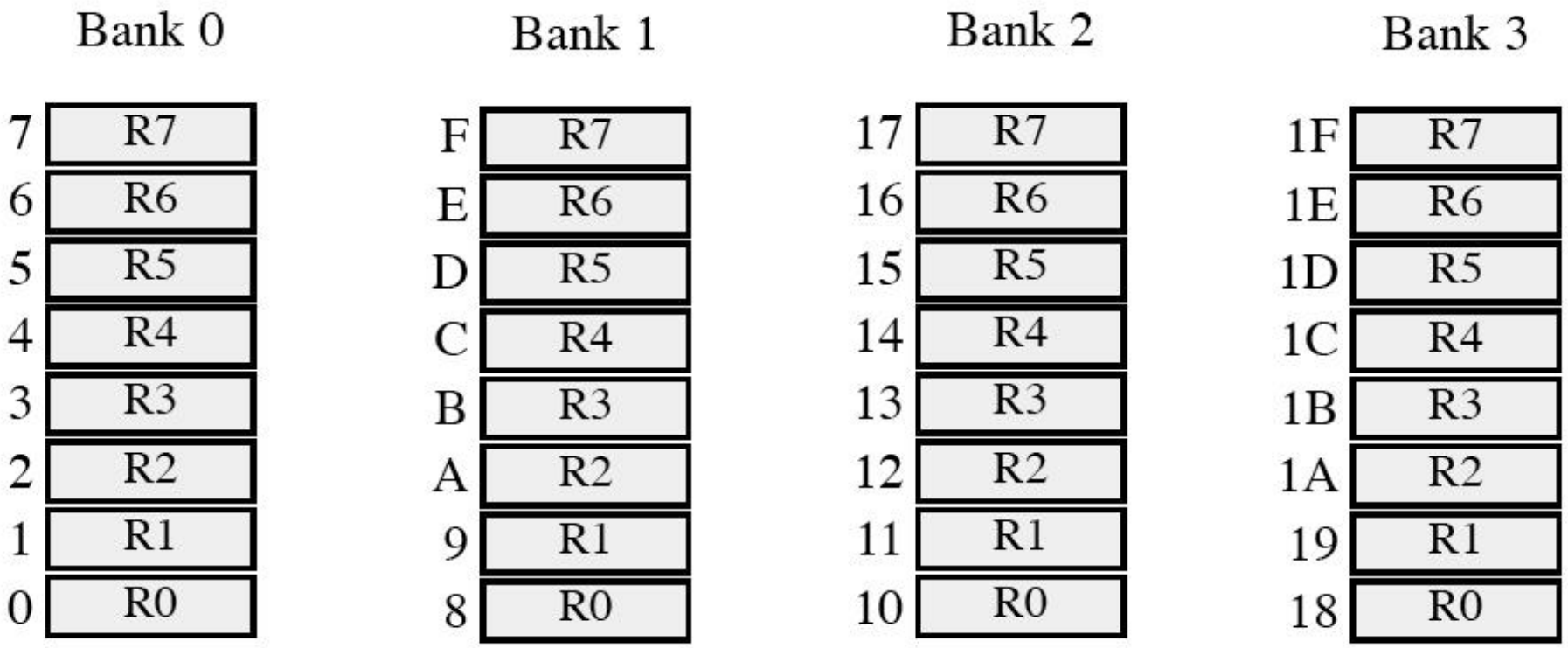


Figure 2–8 128-Byte Memory Space from ProView 32 Simulator

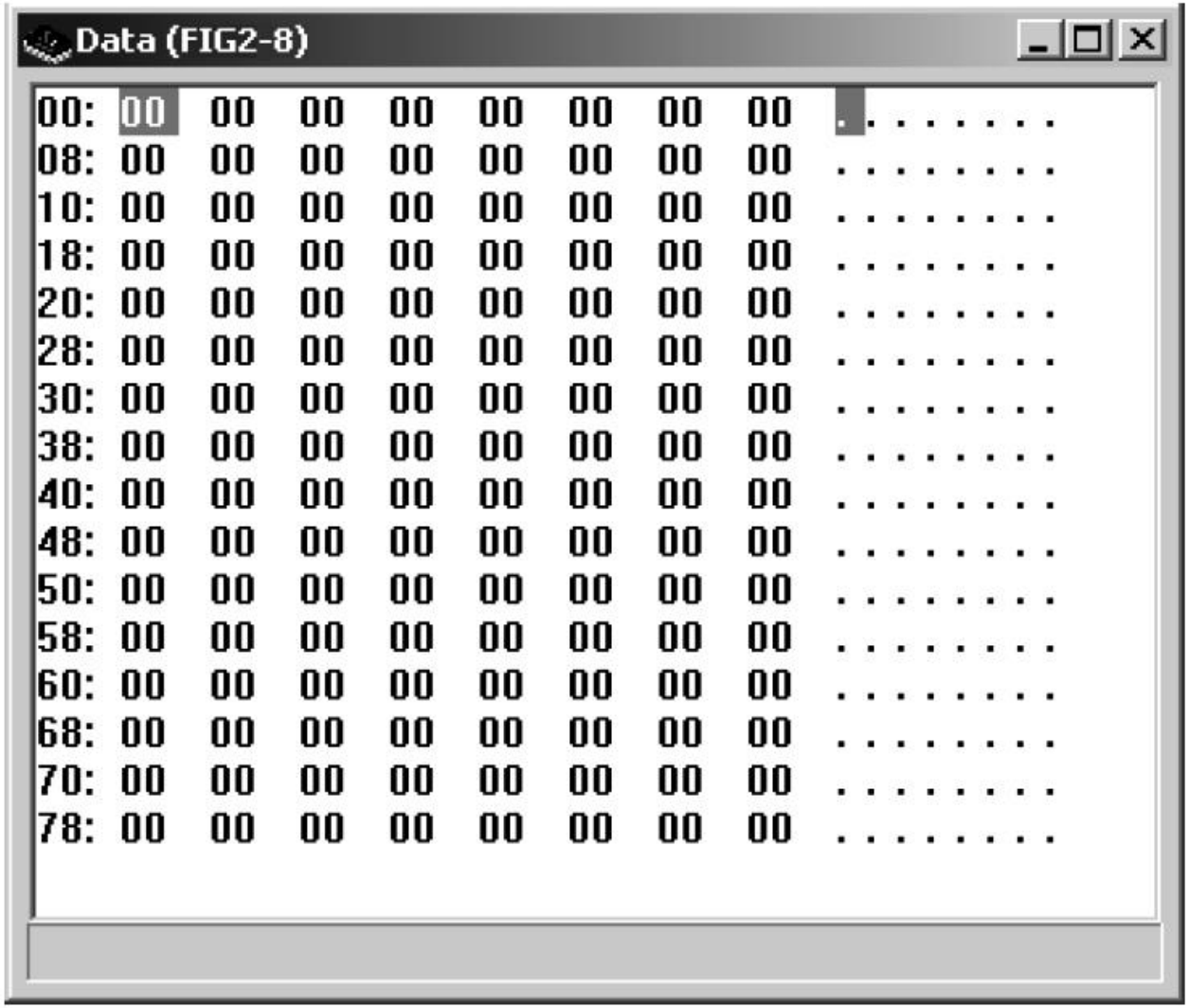


Figure 2–9 Register's Screen from Keil Simulator

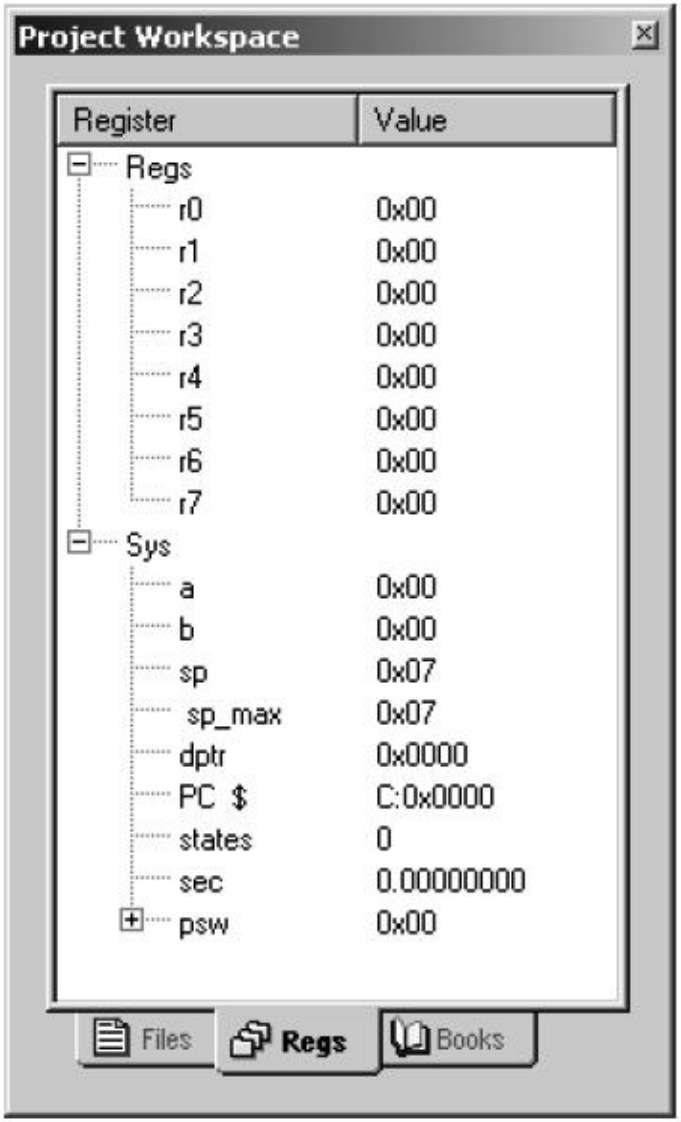


Figure 2–10 128-Byte Memory Space from Keil Simulator

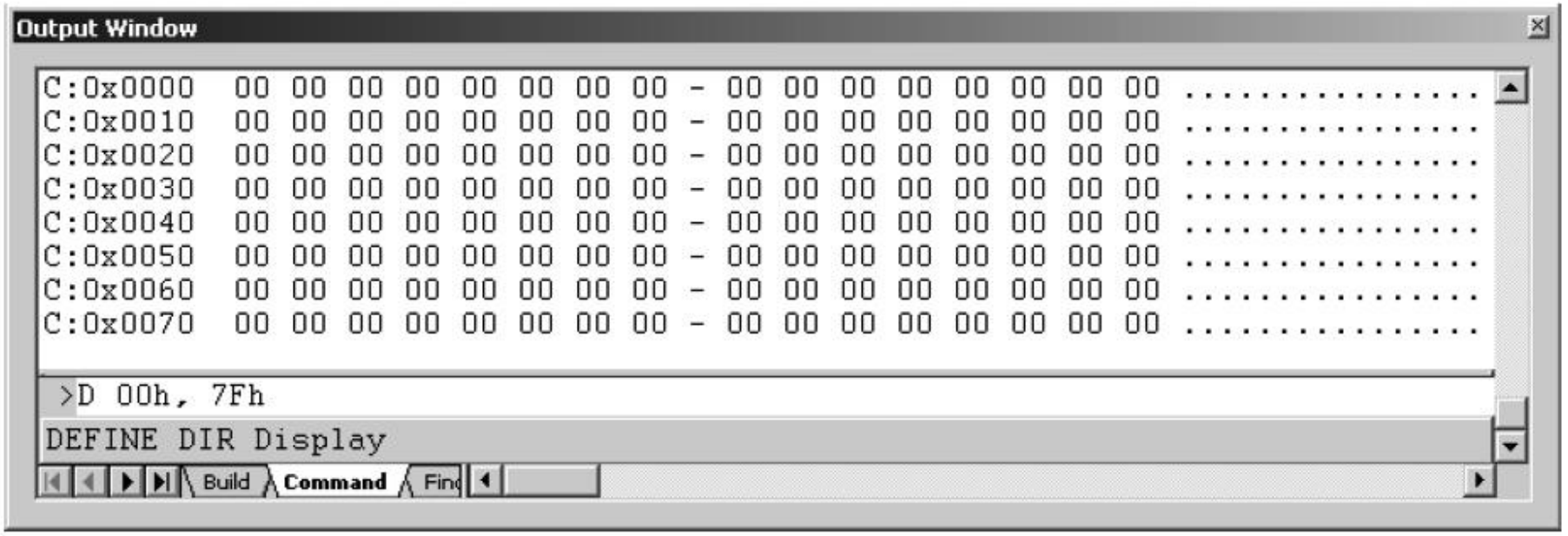


Table 2–1 Instructions That Affect Flag Bits

Instruction	CY	OV	AC
ADD	X	X	X
ADDC	X	X	X
SUBB	X	X	X
MUL	0	X	
DIV	0	X	
DA	X		
RRC	X		
RLC	X		
SETB C	1		
CLR C	0		
CPL C	X		
ANL C, bit	X		
ANL C, /bit	X		
ORL C, bit	X		
ORL C, /bit	X		
MOV C, bit	X		
CJNE	X		

Note: X can be 0 or 1.

Table 2–2 PSW Bits Bank Selection

	RS1 (PSW.4)	RS0 (PSW.3)
Bank 0	0	0
Bank 1	0	1
Bank 2	1	0
Bank 3	1	1