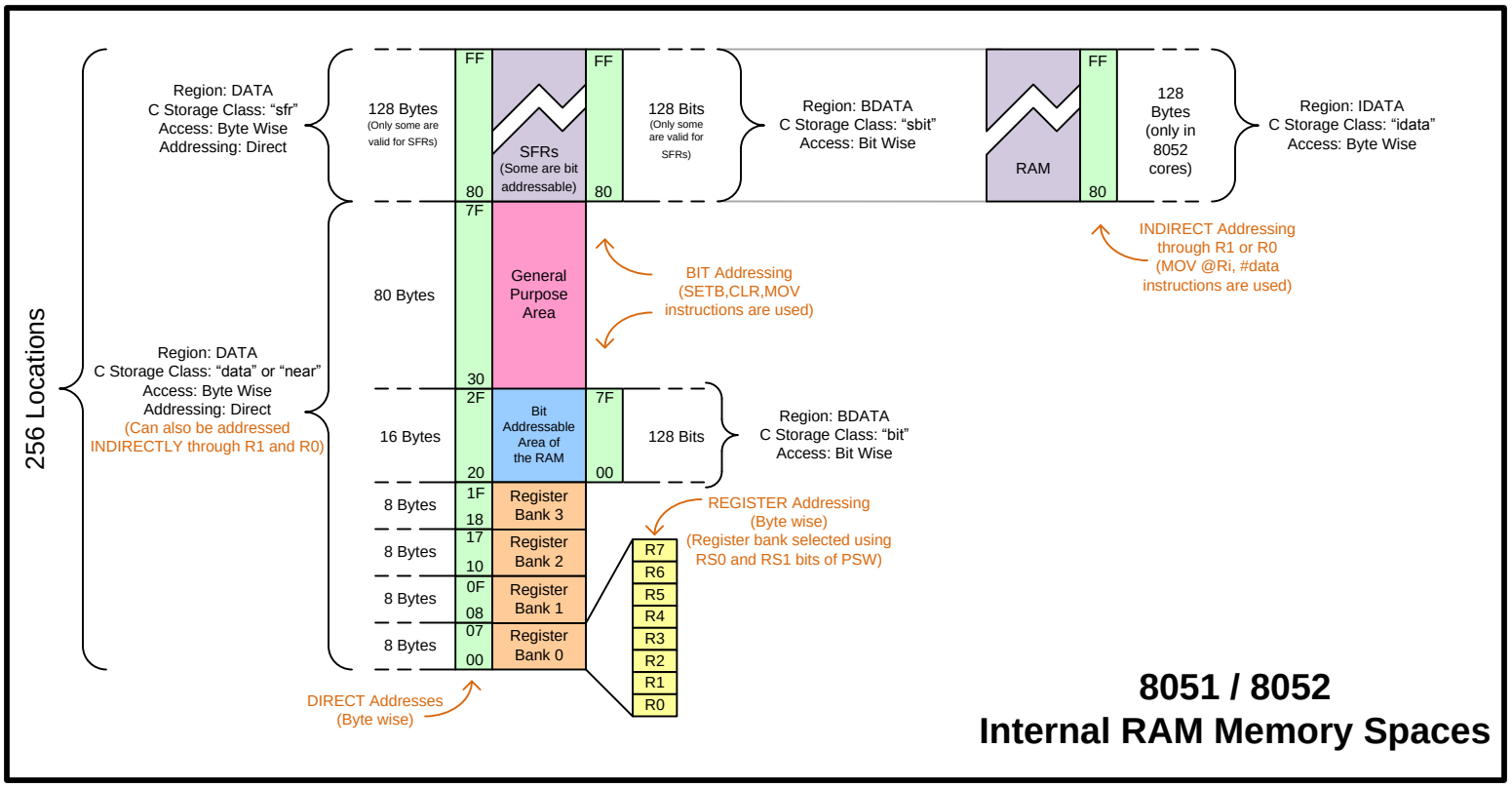
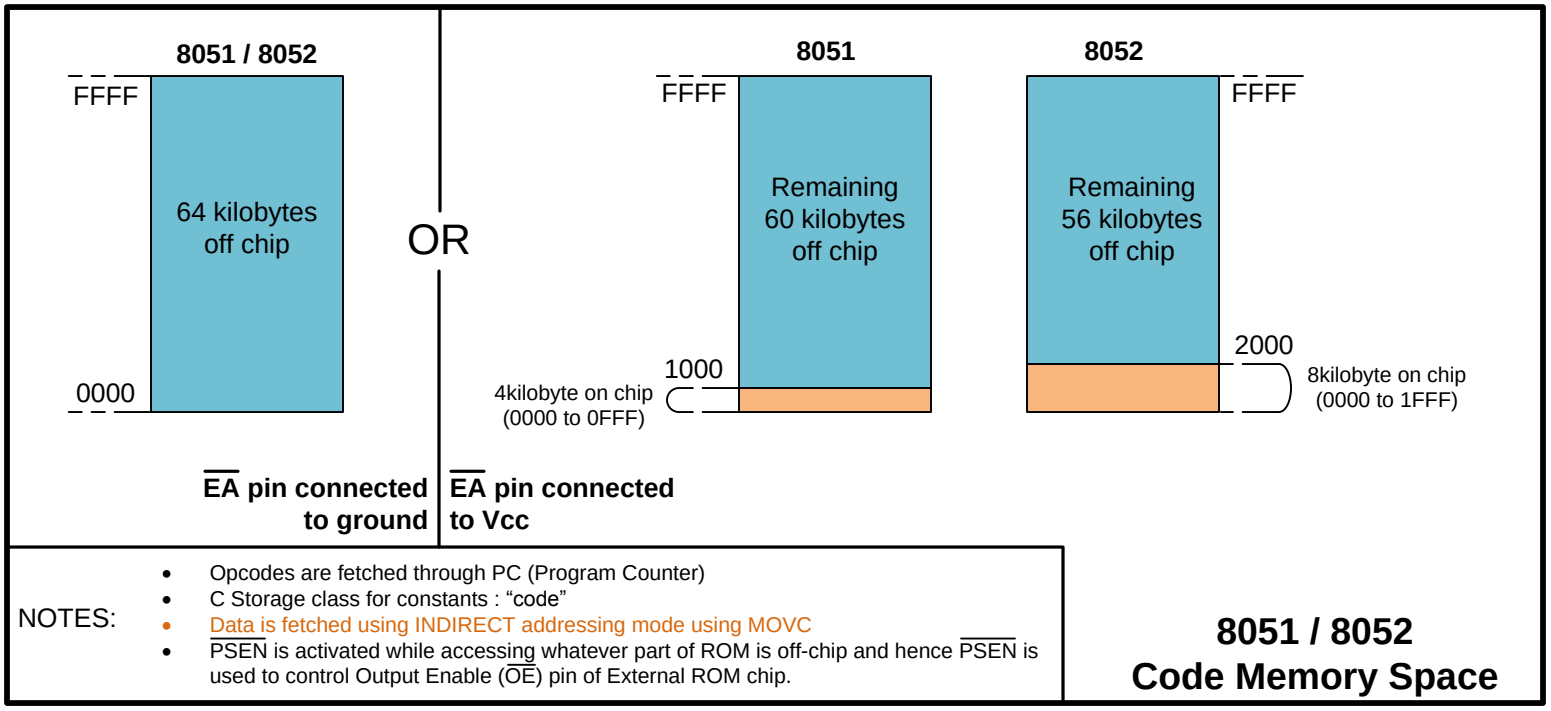
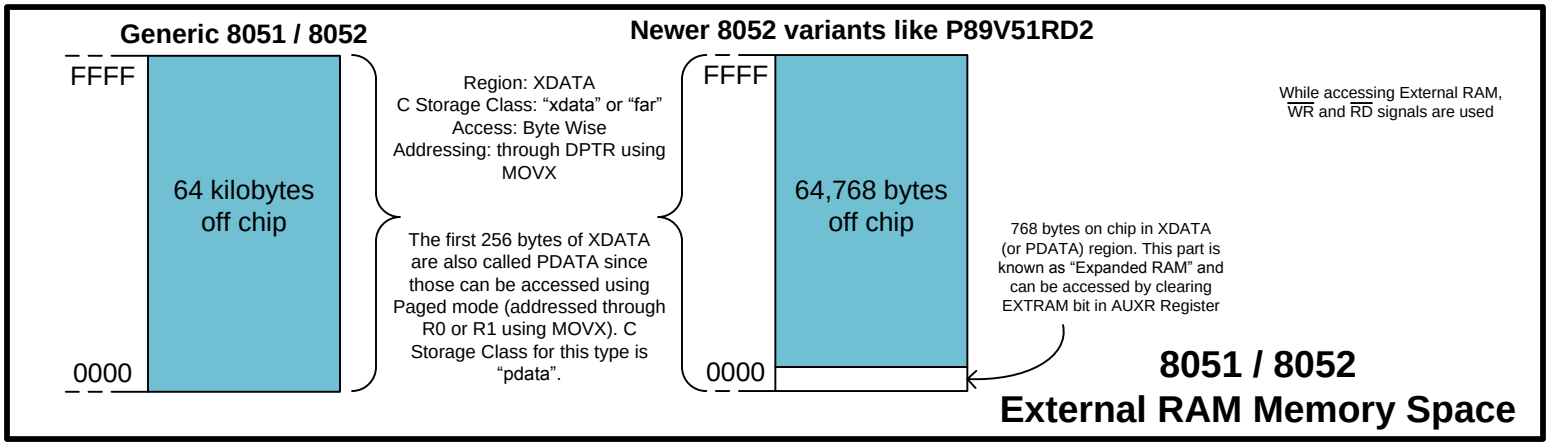

256 Locations
Region: DATA
C Storage Class: "sfr"
Access: Byte Wise
Addressing: Direct
128 Bytes
(Only some are valid for SFRs)
FF
80
SFRs
(Some are bit addressable)
FF
80
128 Bits
(Only some are valid for SFRs)
Region: BDATA
C Storage Class: "sbit"
Access: Bit Wise
RAM
FF
80
128 Bytes (only in 8052 cores)
Region: IDATA
C Storage Class: "idata"
Access: Byte Wise
INDIRECT Addressing through R1 or R0 (MOV @Ri, #data instructions are used)
Region: DATA
C Storage Class: "data" or "near"
Access: Byte Wise
Addressing: Direct
(Can also be addressed INDIRECTLY through R1 and R0)
80 Bytes
7F
General Purpose Area
30
BIT Addressing (SETB,CLR,MOV instructions are used)
16 Bytes
2F
20
Bit Addressable Area of the RAM
7F
00
128 Bits
Region: BDATA
C Storage Class: "bit"
Access: Bit Wise
8 Bytes
1F
18
Register Bank 3
8 Bytes
17
10
Register Bank 2
8 Bytes
0F
08
Register Bank 1
8 Bytes
07
00
Register Bank 0
REGISTER Addressing (Byte wise) (Register bank selected using RS0 and RS1 bits of PSW)
R7
R6
R5
R4
R3
R2
R1
R0
DIRECT Addresses (Byte wise)
8051 / 8052
Internal RAM Memory Spaces


8051 / 8052
FFFF
64 kilobytes off chip
0000
OR
8051
FFFF
Remaining 60 kilobytes off chip
1000
4kilobyte on chip (0000 to 0FFF)
8052
FFFF
Remaining 56 kilobytes off chip
2000
8kilobyte on chip (0000 to 1FFF)
EA pin connected to ground
EA pin connected to Vcc
NOTES:
Opcodes are fetched through PC (Program Counter)
C Storage class for constants : "code"
Data is fetched using INDIRECT addressing mode using MOVC
PSEN is activated while accessing whatever part of ROM is off-chip and hence PSEN is used to control Output Enable (OE) pin of External ROM chip.
8051 / 8052
Code Memory Space


Generic 8051 / 8052
FFFF
64 kilobytes off chip
0000
Region: XDATA
C Storage Class: "xdata" or "far"
Access: Byte Wise
Addressing: through DPTR using MOVX
The first 256 bytes of XDATA are also called PDATA since those can be accessed using Paged mode (addressed through R0 or R1 using MOVX). C Storage Class for this type is "pdata".
Newer 8052 variants like P89V51RD2
FFFF
64,768 bytes off chip
0000
768 bytes on chip in XDATA (or PDATA) region. This part is known as "Expanded RAM" and can be accessed by clearing EXTRAM bit in AUXR Register
While accessing External RAM, WR and RD signals are used
8051 / 8052
External RAM Memory Space