Quadrant II – Transcript and Related Materials

Programme : Bachelor of Science (Second Year)

Subject : Physics

Paper Code : PYS107

Paper Title : Microcontroller Architecture and Programming

Module Name : External data move and Code Memory read only data move.

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Notes

External Data Moves

8051 microcontroller chip can access only 256 bytes of RAM & 4K of ROM. It is possible to expand RAM and ROM memory space by adding external memory chips to the 8051 microcontroller. The external memory can be as large as 64K for each of the RAM and ROM memory areas. *Opcodes* that access this external memory always use indirect addressing to specify the external memory.

The R0, R1 registers and the suitably named DPTR can be used to hold the address of the data byte in external RAM.

R0 and R1 are limited to external RAM address ranges of 00h to 0FFh,(256 Bytes data) while the DPTR register, can address the maximum RAM space of 0000h to 0FFFFh. (65536 bytes = 64K)

An X is added to the MOV mnemonics to serve as a reminder that the data move is external to the 8051.

Code Memory Read-Only Data Moves

Data moves between RAM locations and 8051 registers are made by using MOV and MOVX *opcodes*. The data is usually of a temporary or "scratch pad" nature and disappears when the system is powered down.

There are times when access to a pre-programmed mass of data is needed, such as when using tables of predefined bytes. This data must be permanent to be of repeated use and is stored in the program ROM (external ROM area)

Access to this data is made possible by using indirect addressing and the A register in combination with either the PC or the DPTR. In both cases, the number in register A is added to the pointing register to form the address in ROM where the desired data is to be found. The data is then fetched from the ROM address so formed and placed in the A register. The original data in A is lost, and the addressed data takes its place.

The letter C is added to the MOV mnemonic to highlight the use of the *opcodes* for moving data from the source address in the code ROM to the A register in the 8051.