

Unit → 9

1.) Jump Instruction ...

JMP address (label)

JMP = Unconditional Jump

Conditional Jump Address Label ...

- ① JZ addr (label) :- Jump if the result is zero.
- ② JNZ addr (label) :- Jump if the result is not zero.
- ③ JC addr (label) :- Jump if there is a carry.
- ④ JNC addr (label) :- Jump if there is no carry.
- ⑤ JP addr (label) :- Jump if the result is plus.
- ⑥ JM addr (label) :- Jump if the result is minus.
- ⑦ JPE addr (label) :- Jump if even parity.
- ⑧ JPO addr (label) :- Jump if odd parity.
- ⑨ CALL addr (label) :- Unconditional take call the sub-routine identify by the address.

Conditional Call Address Label ...

- ① CC addr (label) :- Call subroutine if carry is equal to 1.
- ② CNC addr (label) :- Call subroutine if carry status $CS = 0$
- ③ CZ addr (label) :- Call subroutine if the result is 0 the zero status $Z = 1$.
- ④ CNZ addr (label) :- Call subroutine if the result is not 0 the zero status $Z = 0$.
- ⑤ CP addr (label) :- Call subroutine if the result is ~~minus~~ plus the sign status $S = 0$
- ⑥ CM addr (label) :- Call subroutine if the result is minus the sign status $S = 1$

⑦ CPE addr (level) :- Call subroutine if even parity
the parity status $p=1$.

⑧ CPO addr (level) :- Call subroutine if odd parity
the parity status $p=0$.

RET - Return from Subroutine ...

① RC addr (level) :- Return from subroutine if carry status
 $CS=1$.

② RNC addr (level) :- Return from subroutine if carry status
 $CS=0$.

③ RZ addr (level) :-

④ RNZ addr (level) :-

⑤ RP addr (level) :-

⑥ RM addr (level) :-

⑦ RPE addr (level) :-

⑧ RPO addr (level) :-

⑨

2000	21, 01, 25	LXI	H, 2501	Get address of 1 st number in HL pair
2003	7E	MOV	AM	1 st number in accumulator.
2004	23	INX	H	Increment content of HL pair.
2005	86	ADD	M	Add 1 st and 2 nd number.
2006	32, 03, 25	STA	2503	Store sum in 2503
2009	76	HLT	STOP	Stop

2) Introduction to Embedded C...

C Language	Embedded C
C is a well structured, well defined and standardised general purpose programming language.	Embedded C can be considered as a subset of C language.
C is used for desktop computer.	Embedded C is for microcontroller based application.
C has the luxury to use resources of a desktop PC like memory, OS (operating system) etc. on desktop system.	Embedded C has to use with the limited resources (RAM, ROM, input output) on an embedded processor.
Compiler for C typically generate OS depend executable	Embedded C requires compiler to create files to be downloaded to the microprocessors where it need to run.

Applicability to 8051...

The 8051 is a popular 8 bit microcontroller known for its simplicity, cost effectiveness, and wide spread used in various embedded applications.

Embedded C is widely used for programming 8051 microcontrollers due to its advantage over assembly language, including:-

- (i) Readability & Maintainability
- (ii) Faster Development
- (iii) Portability
- (iv) Access to libraries
- (v) Hardware Interaction
- (vi) Interrupt Handling

- (vii) Memory Management
- (viii) Development Efficiency

(i) Readability and Maintainability

C code is generally more readable and easier to maintain compare to assembly language, especially for complex program.

(ii) Faster Development

Writing code in embedded C is often faster and more efficient than in assembly language, reduce development time.

(iii) Portability

While requiring some adjustment, C code can be more easily ported to different microcontrollers compare to assembly code, which is highly specific to the target architecture.

(iv) Access to Libraries

Embedded C allows existing C libraries and functions, further accelerating development.

(v) Hardware Interaction

Embedded C provides mechanism to directly access and manipulate the 8051 register and I/O ports, allowing precise and general purpose I/O pins.

(vi) Interrupt Handling

Embedded C supports the declaration and implementation of interrupt service routine (ISRs) for the 8051, enable the microcontroller to respond to external event and perform time critical task.

(vii) Development efficiency

Programming in embedded C offers a higher level of abstraction compare to assembly language, making

codes development faster, more readable and easier to maintain and debug for 8051 based application.

(viii) Memory Management

While the 8051 has limited memory resources (2K byte of RAM for basic 8051), embedded C compiler for the 8051, like keil C51 provides memory model (small, large compact) to optimize memory uses and manage data store within this effectively.

3) General Structure of Embedded C Program ...

The general structure of an embedded C system program often follows a pattern design for interaction with hardware and continuous operation.

While specific implementation can vary, the core components typically #include <header file.h>, main() function, loop - for loop, while loop, do-while loop.

Interrupt Service Routine

These are special function that execute automatically in response to specific hardware events (button press, timer over flow, data reception on a serial port).