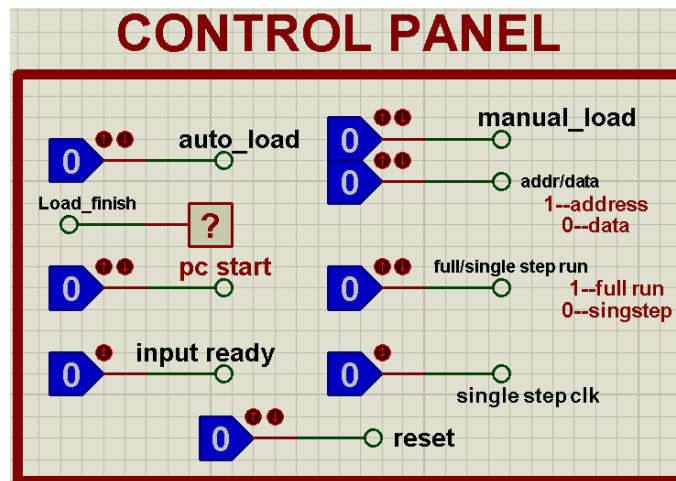


SAP MANUAL



Reset:

- At the beginning of each run pc has to be reset once. While '*reset*' button is in **1** position one logic toggle in '*single step clk*' will reset the pc.

➤ Program loading:

Auto load:

- After resetting '*auto_load*' button in **1** position will automatically start program loading. All other buttons should be in '**0**' position.
- '*Load_finish*' button in **1** position indicates program is loading.
- When '*Load_finish*' button becomes **0** program loading is finished .

Manual load:

- After resetting '*manual_load*' button in **1** position will initiate program loading from hex keypad. All other buttons should be in '**0**' position.
- After that '*addr/data*' button in **1** position indicates now memory address of RAM will be received from keypad.
- Then '*addr/data*' button in **0** position will receive data from keypad and save to the addressed memory location of the previous step.
- After all inputs giving finished make both '*manual_load*' & '*addr/data*' button in **0** position. Then reset the pc in the above mentioned method before program run.

➤ PC run:

Full Run:

- '*full/single step run*' button in **1** position & all other buttons should be in **0** position.
- Then '*pc start*' button in **1** position will start the pc.

Single step run:

- '*full/single step run*' button in **0** position & all other buttons should be in **0** position.
- Then '*pc start*' button in **1** position will start the pc.
- '*single step clk*' button will serve as the clock for single step run.

➤ Input method from keypad:

- While manual programming only pressing the key buttons will do the job.
- In single step run after giving the input firstly one logic toggle in '*single step clk*' then one logic toggle in '*input ready*' will complete the process of giving input.
- In full run only one logic toggle in '*input ready*' will complete the process of giving input.

➤ Programming:

- The program should be written in a file named **Code.txt** file.
- All digits are considered as hexadecimal number.
- All letters must be upper case. No extra blank space.
- All programs must be terminated by **HLT** and all function must be terminated by **RET**.
- **Syntax:**
 - *Direct addressing format: **CALL 000A**
 - *Indirect addressing format: **XCHANGE[0010],B**
 - *Data allocation to a particular memory: **0010 23** (saves **23H** in **0010H** memory location)
 - *Writing subroutine function starting from a particular address:
First write the address location in a line then from next line start writing the function. For example: **000A**
MOV B,75
RET
Writes a function to move byte **75H** to **register B** at memory location **000AH** . That means this function can be accessed by **CALL 000A** operation.
- Program must be written sequential to the memory address. For example , **0020 23** can't be written before **0010 23** instruction.

➤ Troubleshooting:

In case the SAP hang and even resetting it does not reset control rom counter. Make all buttons in control panel in **0** position except **pc start** in **1** position. Then one logic toggle in **input ready** button. Then change **pc start** to **0** position, Then reset the pc again will complete the process.