

## CP-PIC V3.0&V4.0

We designed Board Microcontroller CP-PIC V3.0 & V4.0 to use with Microcontroller PIC family with No. 16F877-20P, 18F442 and 18F458 or other number that has the same structure and Pin position. Each CPU number has different specifications and we can summarize approximately about its specifications of each CPU number as in the table.

### Device Support and Specification

| DEVICE     | Program Memory    | Data Memory    |                  | CAN    | I/O   | OSC          | Timers | PLL |
|------------|-------------------|----------------|------------------|--------|-------|--------------|--------|-----|
|            | Flash             | RAM<br>(Bytes) | EEPROM<br>(Byte) | Module | (Bit) | max<br>(MHz) |        |     |
| PIC 16F877 | 8K (14-Bit Words) | 368            | 256              | NO     | 33    | 20MHz        | 3      | NO  |
| PIC 18F442 | 16 Kbyte          | 768            | 256              | NO     | 34    | 40MHz        | 4      | YES |
| PIC 18F458 | 32 Kbyte          | 1536           | 256              | YES    | 34    | 40MHz        | 4      | YES |

### Specification

#### ▪ CP-PIC V3.0

- RS - 232 Driver (MAX232) 1 Channel
- ETT CON 34PIN (ET BUS I/O 34PIN)
- 5 Volt Regulator On Board
- High Voltage In-Circuit Serial Programming

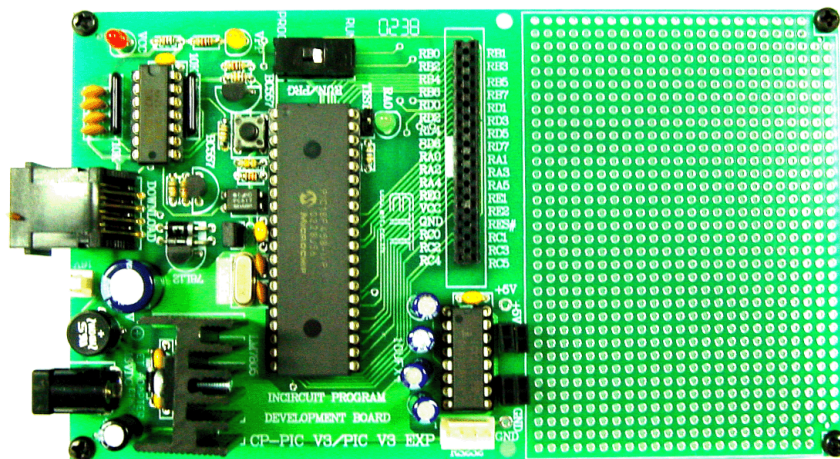
#### ▪ CP-PIC V3.0 EXPANSION

- RS - 232 Driver (MAX232) 1 Channel
- ETT CON 34PIN (ET BUS I/O 34PIN)
- 5 Volt Regulator On Board
- High Voltage In-Circuit Serial Programming
- Project Board

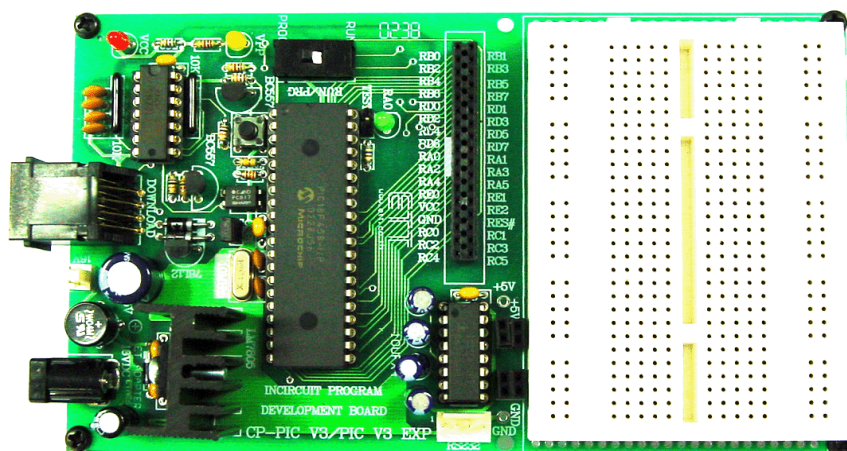
▪ **CP-PIC V4.0**

- RS - 232 Driver (MAX232) 1 Channel
- RS-422/458 (Option)
- ETT CON 34PIN (ET BUS I/O 34PIN)
- 5 Volt Regulator On Board
- High Voltage In-Circuit Serial Programming
- RTC #PCF8583P (Option)
- ADC/IO(CPU)
- CLCD 14PIN Connector for LCD (4 Bit Data)
- EEPROM 24xx (Option)
- PCF8574AP I<sup>2</sup>C IN/OUT (Option)
- KBI/IO 10 Pin Connector
- Relay Onboard 5V (Option)
- Mini Speaker/Buzzer
- I<sup>2</sup>C BUS(EXPAND) Connector

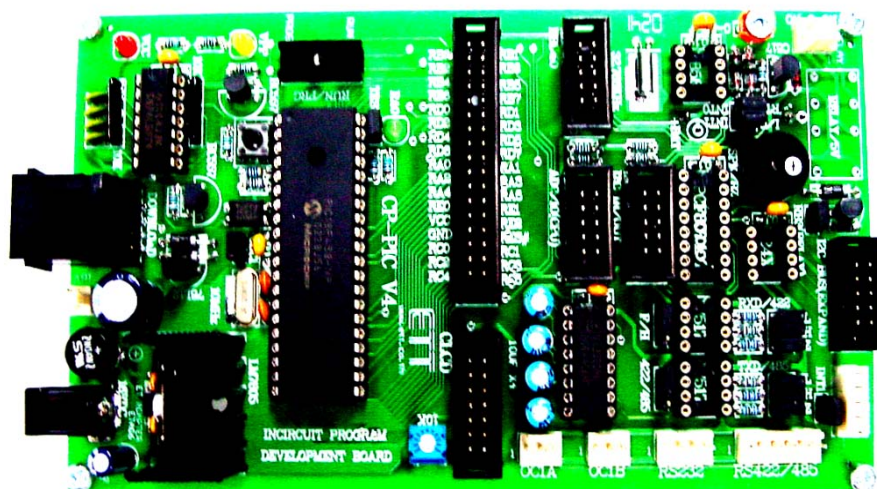
# **Notice** Option is the part of blank Socket and if user want to use its, need to purchase additionally.



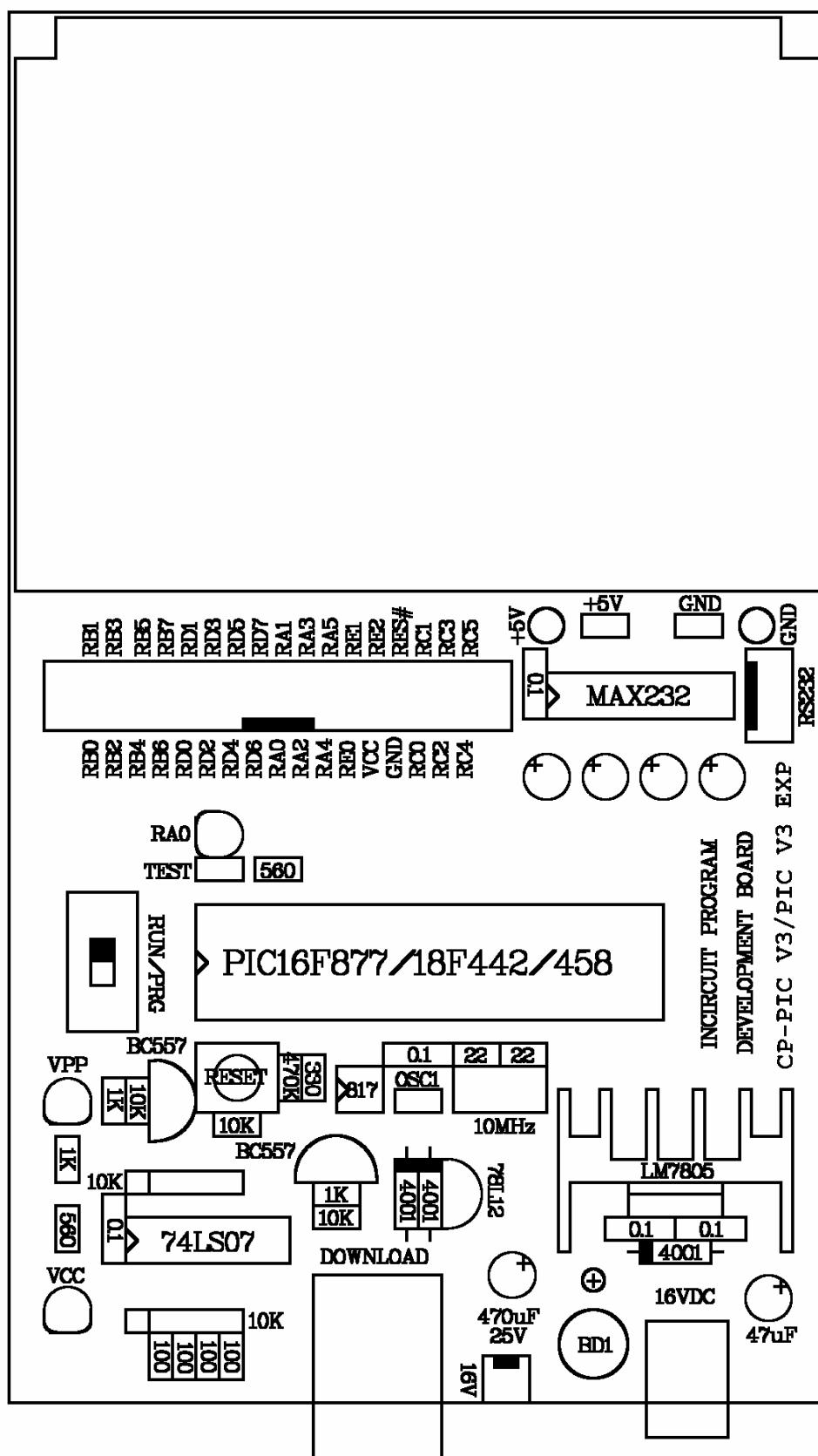
**CP-PIC V3.0**



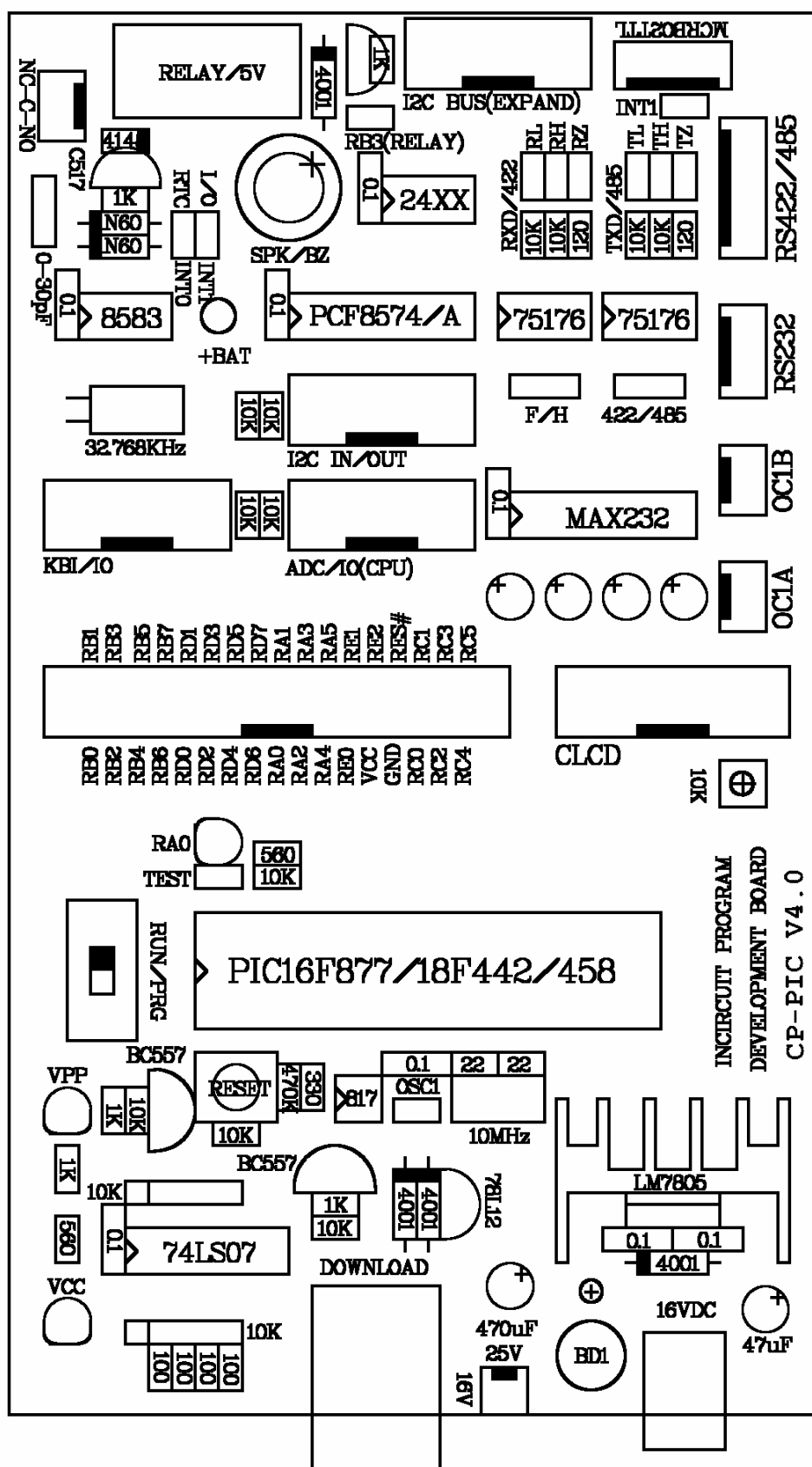
CP-PIC V3.0 EXPANSION



CP-PIC V4.0

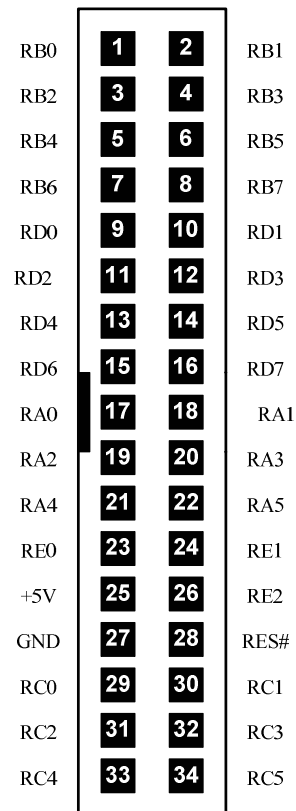


CP-PIC V3.0 and V3.0 EXPANSION

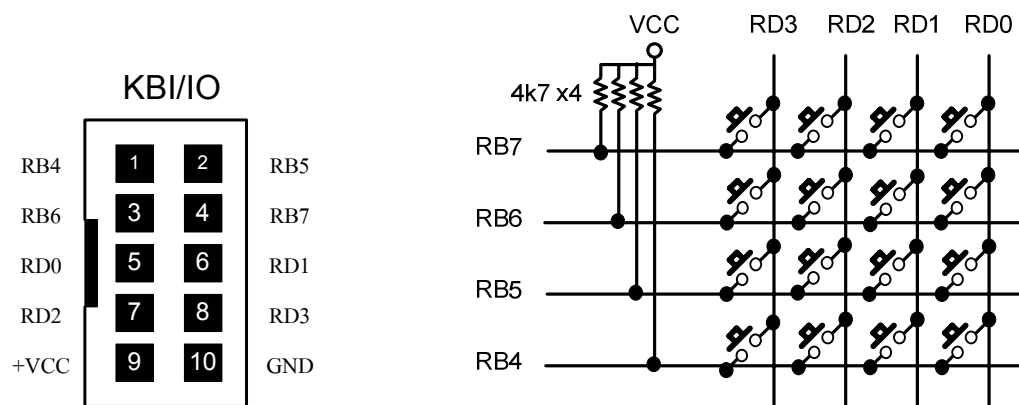


CP-PIC V4.0

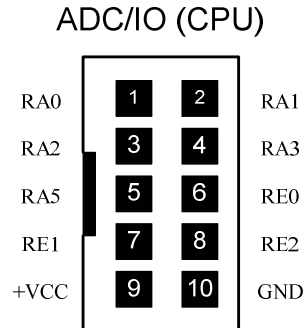
- **ET-34 Pin** Connector Layout following.



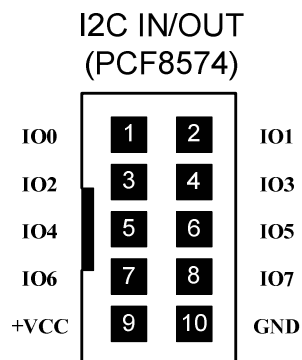
- **KBI/IO** uses to interface with Matrix Key 4x4 or 4x3 and its PIN arrangment is following.



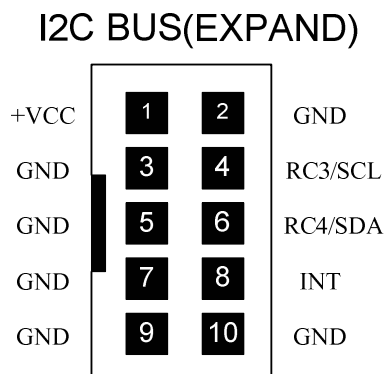
- **ADC/IO** which is Port uses to interface with connector signal of Analog to Digital Converter of PIC MCU. There's 8 channel ; AN0...AN7 and its arrangement of connector signal as following;



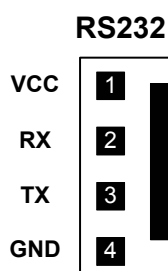
- **I2C IN/OUT** is a Port Signal to interface with I/O from IC PCF8574 which is controlled via I2C BUS. There's 8 I/O connector signal as following;



- **I2C BUS (EXPAND)** uses to expand signal of I2C BUS.

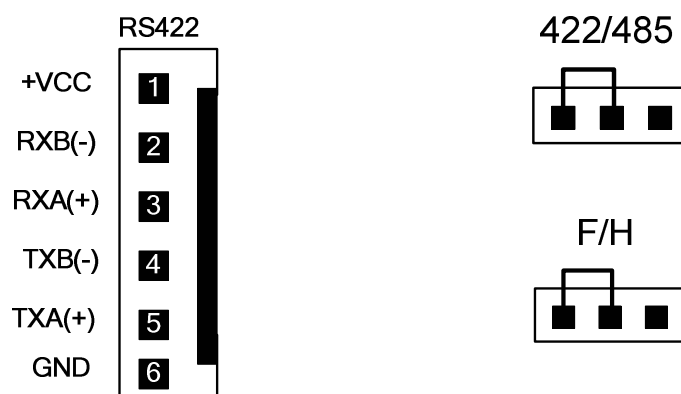


- **RS232** uses to send/receive data RS232 by  
RX = PORTC.7 and TX = PORTC.6

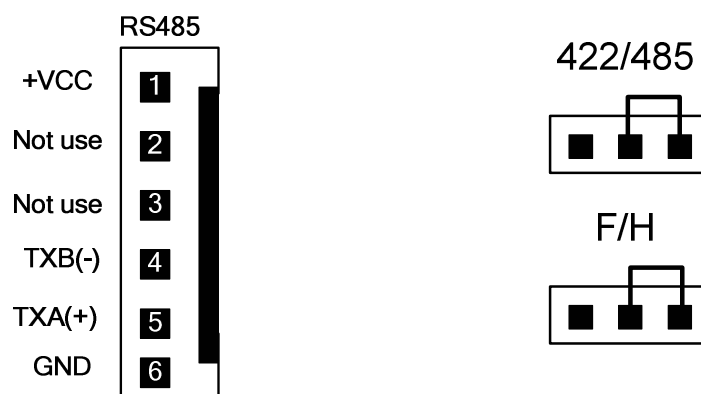


- **RS422/485** uses to communicate with basic RS422 (FULL Duplex) and RS485 (HALF Duplex). Its connections are;

- Interface all 4 of RS422; RXB, RXA, TXB and TXA and then select Jumper as following;



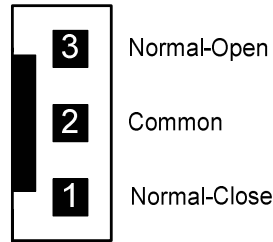
- Interface only 2 of RS485 and need to control direction of send/receive via connector signal of RC5.



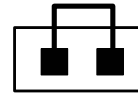
\* In the part of JUMPER RL, RH, RZ, TL, TH and TZ use to be Matching Impedance in case of using a long cable.

- **RELAY** is a Port for RELAY and user can control RELAY via connector signal of RB3 that need to SET JUMPER at RB3 (RELAY) .

#### RELAY

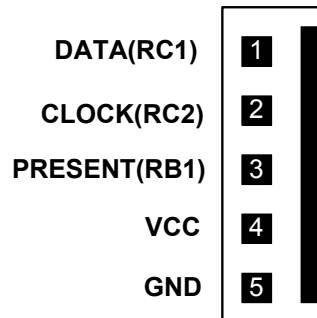


#### RB3(RELAY)



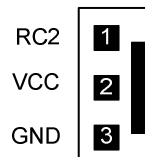
- **SPK/BZ** which is a mini speaker is controlled via connector signal of RB2.
- **MCRB02TTL** is a Port for Magnetic Card Reader MCRB02TTL.

#### MCRB02TTL

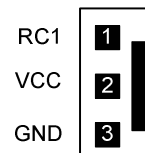


- **OC1A** and **OC1B** are Port for PWM that are connector signal PORTC.2 and PORTC.1 as following;

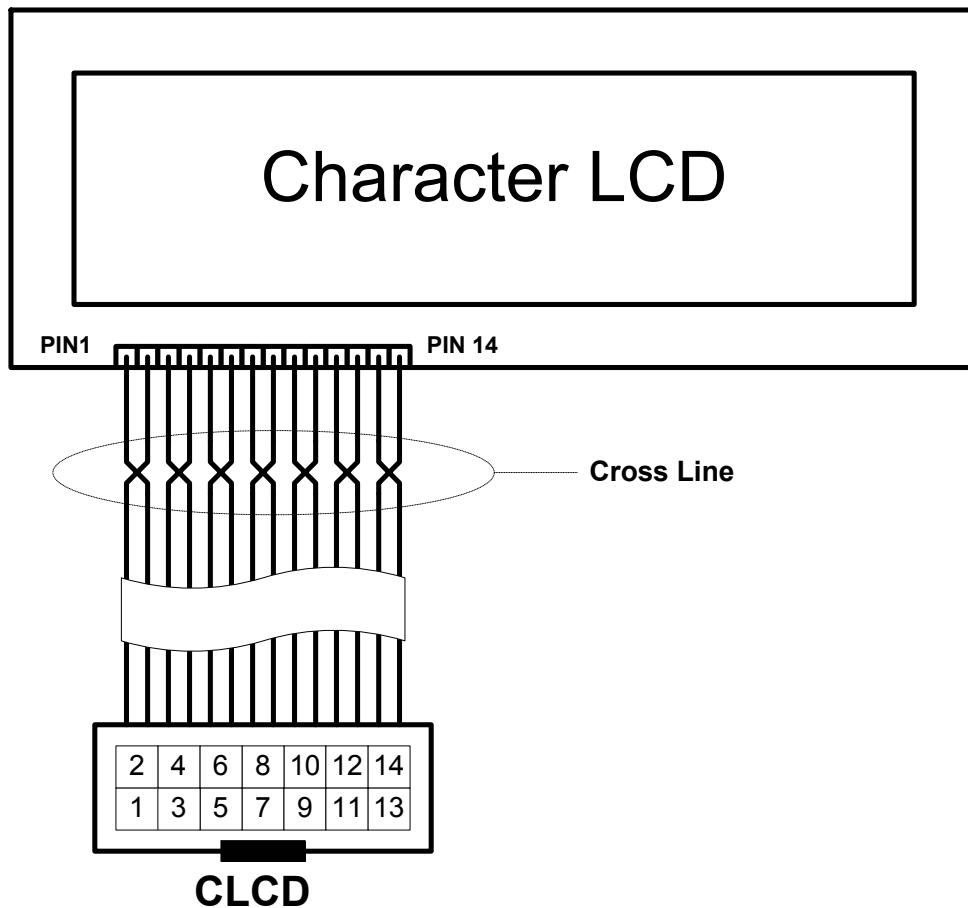
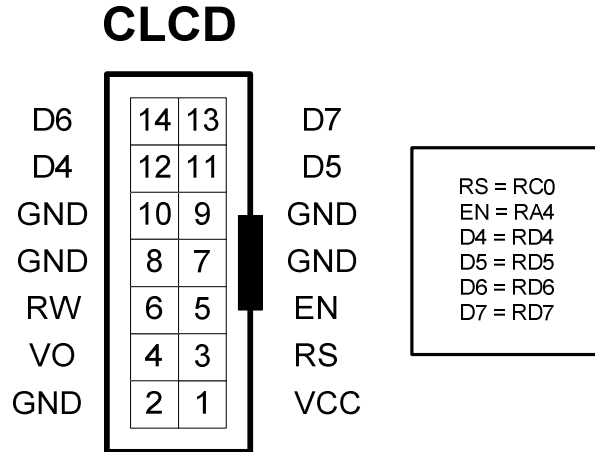
#### OC1A



#### OC1B



- **CLCD** which is a Port Connector is provided for Character LCD Display. It arranges 4 Bit Data signal and its connector signal arrangement as following;



- Using 12C BUS component inside Board by interface in the same Bus signal. Connector signal of SDA interfaces with PORTC.4 and SCL interfaces with PORTC.3. Each component has different address as in the table.

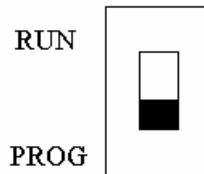
| I2C Device               | Control Address for General Format | Control Address for CP-PIC V4.0 |                          |
|--------------------------|------------------------------------|---------------------------------|--------------------------|
|                          |                                    | Read Commands                   | Write Commands           |
| RTC : PCF8583            | [1][0][1][0][0][0][X][?]           | [1][0][1][0][0][0][1][1]        | [1][0][1][0][0][0][1][0] |
| E <sup>2</sup> PROM:24XX | [1][0][1][0][X][X][X][?]           | [1][0][1][0][1][0][0][1]        | [1][0][1][0][1][0][0][0] |
| I/O : PCF8574            | [0][1][0][0][X][X][X][?]           | [0][1][0][0][0][0][0][1]        | [0][1][0][0][0][0][0][0] |
| I/O : PCF8574A           | [0][1][1][1][X][X][X][?]           | [0][1][1][1][0][0][0][1]        | [0][1][1][1][0][0][0][0] |

- **POWER SUPPLY** Both Board CP-PIC V3.0 & V4.0 can use power supply alternating current type (AC) and direct current type (DC) because there's Rectifier circuit Bridge type with Filter circuit and Regulator +5V inside Board. User can use any voltage not less than 13V because program is designed with High Voltage type, so user need to use power supply that is more than 13V or between 13V to 16V. Can select to interface with Connector CPA 2 PIN or Connector for Adapter, while it is running, its LED "VCC" of power supply will display its result.

## Code Programming

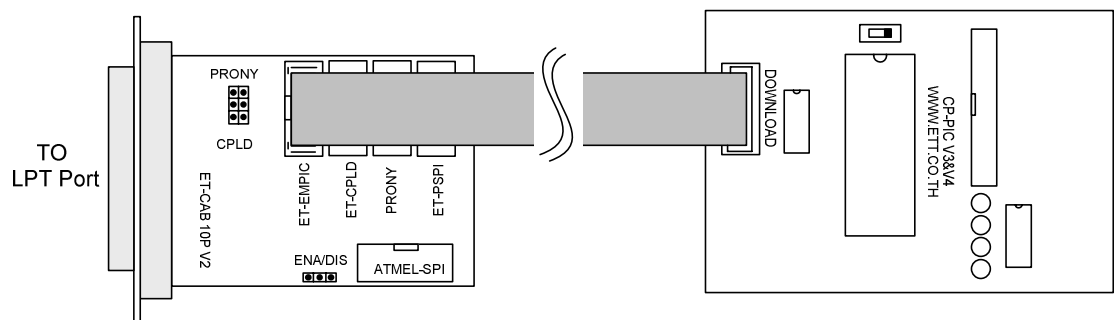
Data Programming into Microcontroller Board "CP-PIC V3.0 & V4.0" is designed as High Voltage Programing and uses power to program as 13 Volt.

User can access into Mode of Programming by select position of SLIDE SWITCH (PROG/RUN) into PROG position.



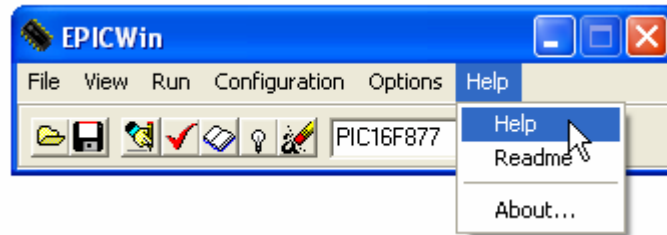
**Select Switch into PROG position.**

For interface Download Cable, user need to connect ET-CAB 10P with LPT Port of computer and then connect Cable from ET-EMPIC port of Board ET-CAB 10P into Port Download of Board CP-PIC V3 & V 4 as in the picture.

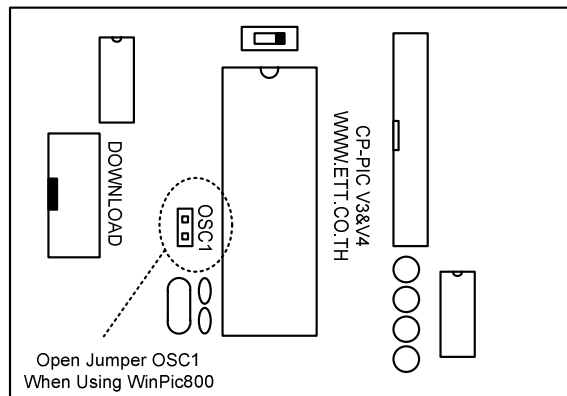


We can use Software EPICWin and WinPic800 for data programming into Board.

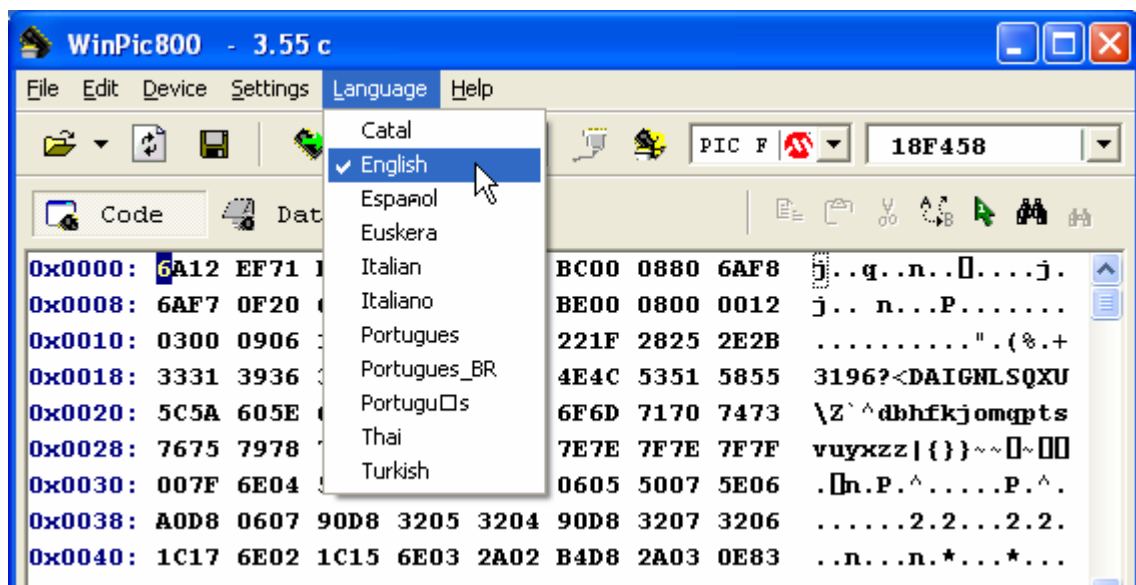
- Using EPICWin, user can learn its details from HELP of program EPICWin because we don't mention them.



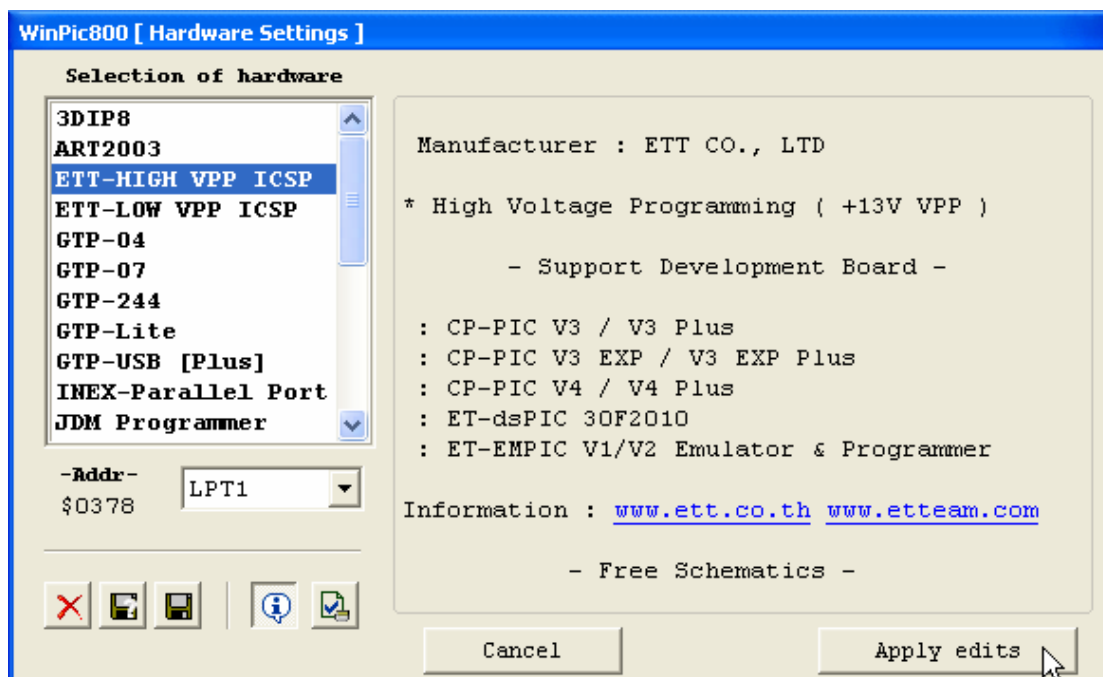
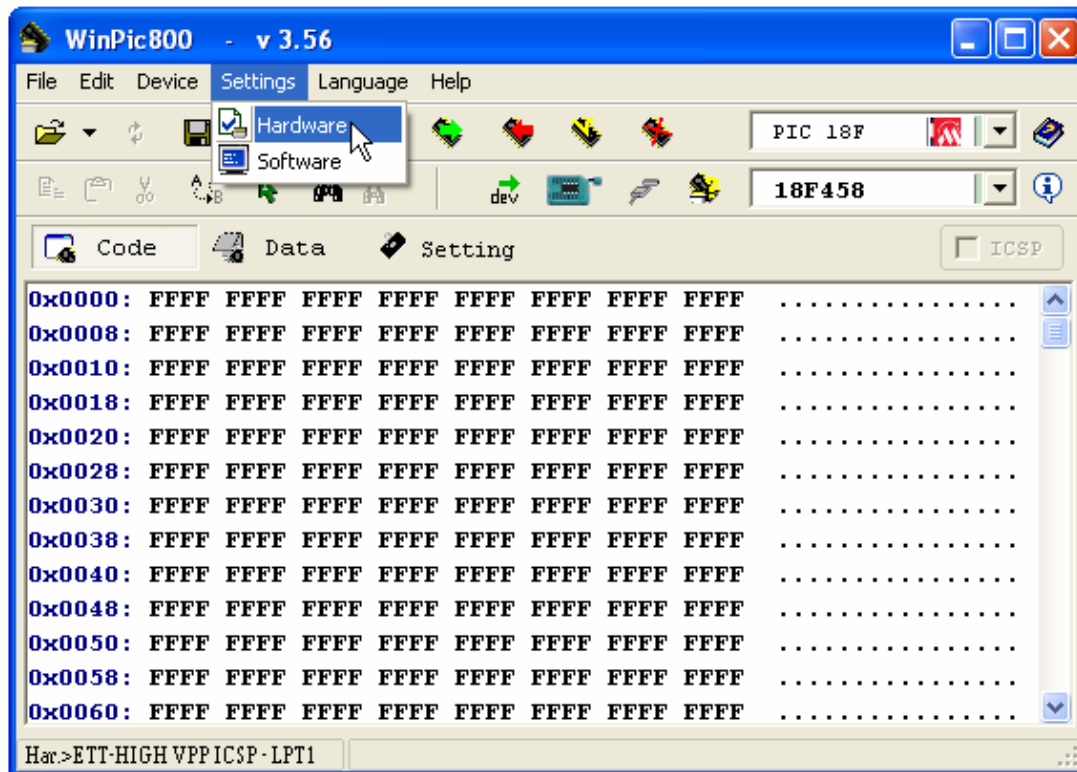
- Using WinPic800, WinPic800 program is one of program that supports data programming into Board "CP-PIC V3 & V4". If want to use this Software, user need to open Jumper OSC1 on board and proceeding to run as following;



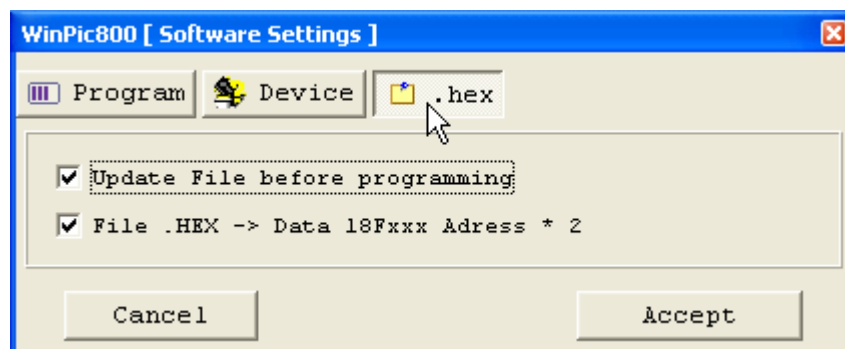
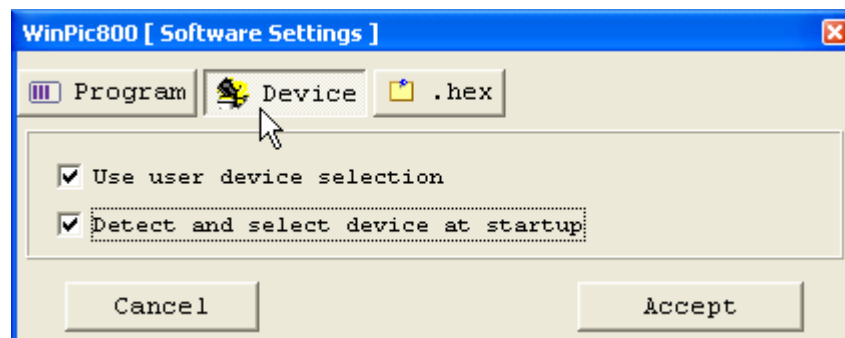
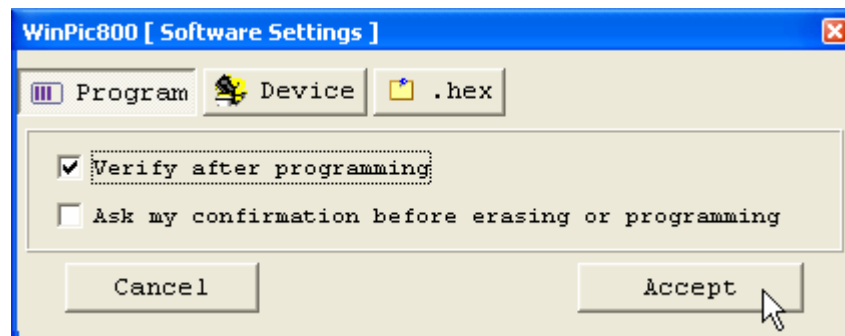
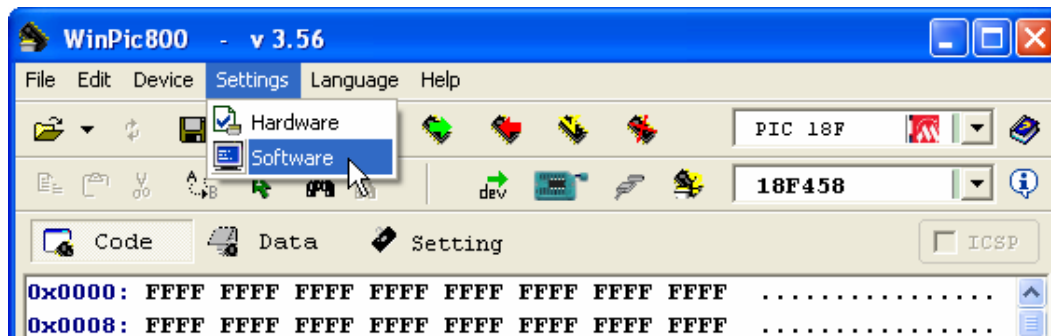
- Assign English to program by click on Menu Language and select English as in the picture.



- Assign to connect through Hardware correctly by click Menu **"Setting → Hardware"**. In case of using Program "WinPic800" with board "CP-PIC V3&V4" and using Download Cable "ET-CAP10PIN V2.0" from ETT, assign mode to connect Hardware as **"ETT-HIGH VPP ICSP"** and in part of LPT select **"Apply edits"** as normally as in the picture.





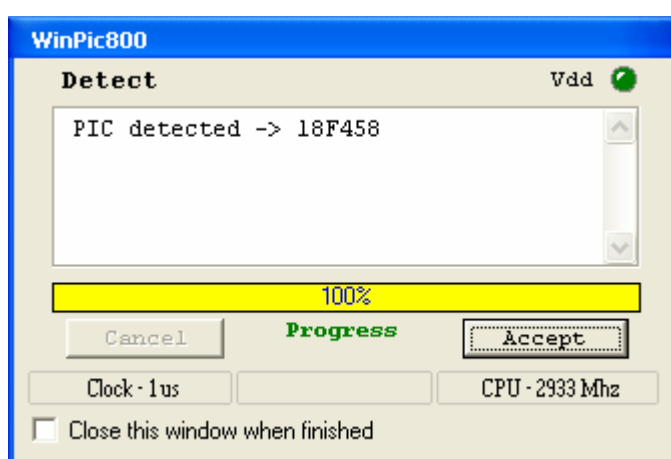
- Assign condition of program operation by click Menu **"Setting Software"**, it will display as in the picture.



In this step may be chosen all steps, but users may think that it takes a long time to download, users may not select unnecessary conditions such as **Verify after programming**. Then select **"Accept"** for save it to use with program forever.

- After assigned default values of program completely, users can run program "WinPic800" preferably. These default values are saved to use with board "CP-PIC V3&V4" forever until users change a new one. There's 2 Mode to run Program "WinPic800", it is run through **Menu Instruction** or **"Button Instructions"** of program as an example;

- Open HEX File to download into MCU via Menu intruction of **"File → Open"** or click Button intructions  and then assign name and address of Hex File that is downloaded.
- Check connecting Hardware with MCU via Menu intruction of **"Device Detect PIC"** or click Button intructions . Program reads ID Code of MCU and displays number of its. In case of using with board "CP-PIC V3&V4" and if it is correct, it will display as in the picture.

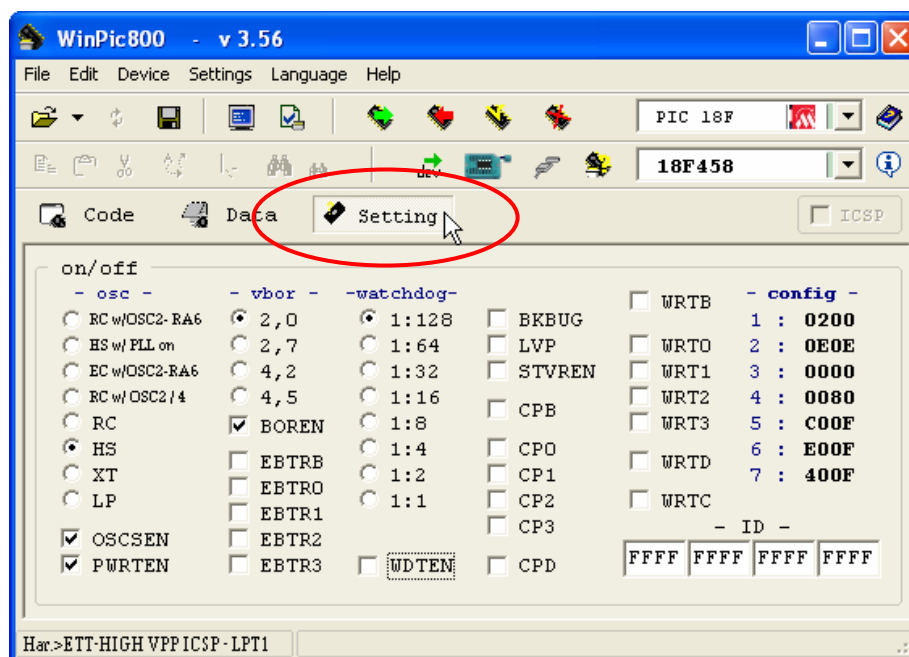


If there's some error of checking number of MCU, user may check position of switch no. "RUN/PROG", signal Cable, Power Supply 13VDC, and including to mode of connecting Hardware as "ETT-HIGH

VPP ICSP" correctly or not. If there's no mistake, program will display the correct number of MCU.


Check default value of PIC Configuration correctly or not. In case of using with board "CP-PIC V3&V4", user need to assign Configuration of MCU in part of LVP as disable LVP ☐ LVP.

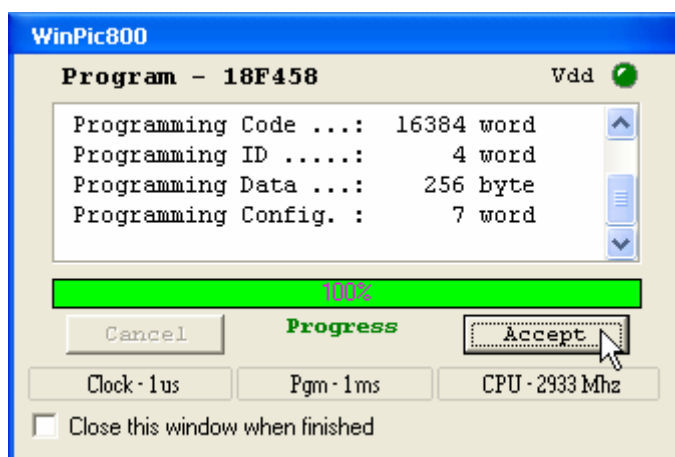
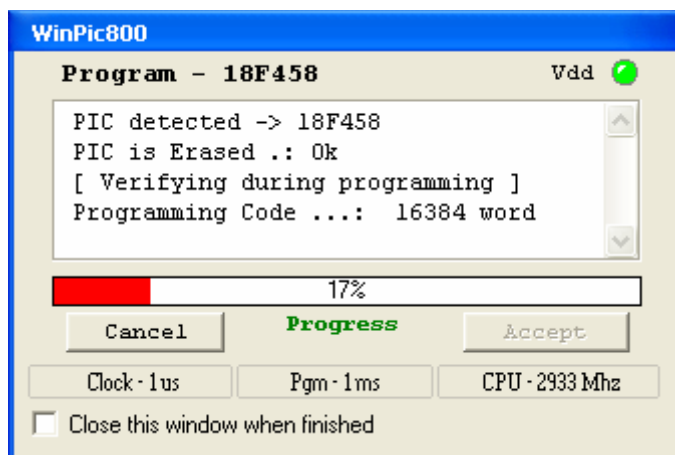
Other Configurations is able to assign preferably. Generally, Configuration is assigned in step of program development, so when is translated program into HEX File, Configuration is set also in HEX File. If users don't assign the correct Configuration, there's some error about its. Users need to correct it before programming by check it from Program Monitor, click Tap of "Setting" as in the picture.



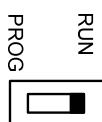
To select Configuration in the part of -OSC- and in case of using Board "CP-PIC V3&V4", if using PIC16F877, user need to select as HS only and if using HS, user can select as both "HS" or "HS w/PLL on" by

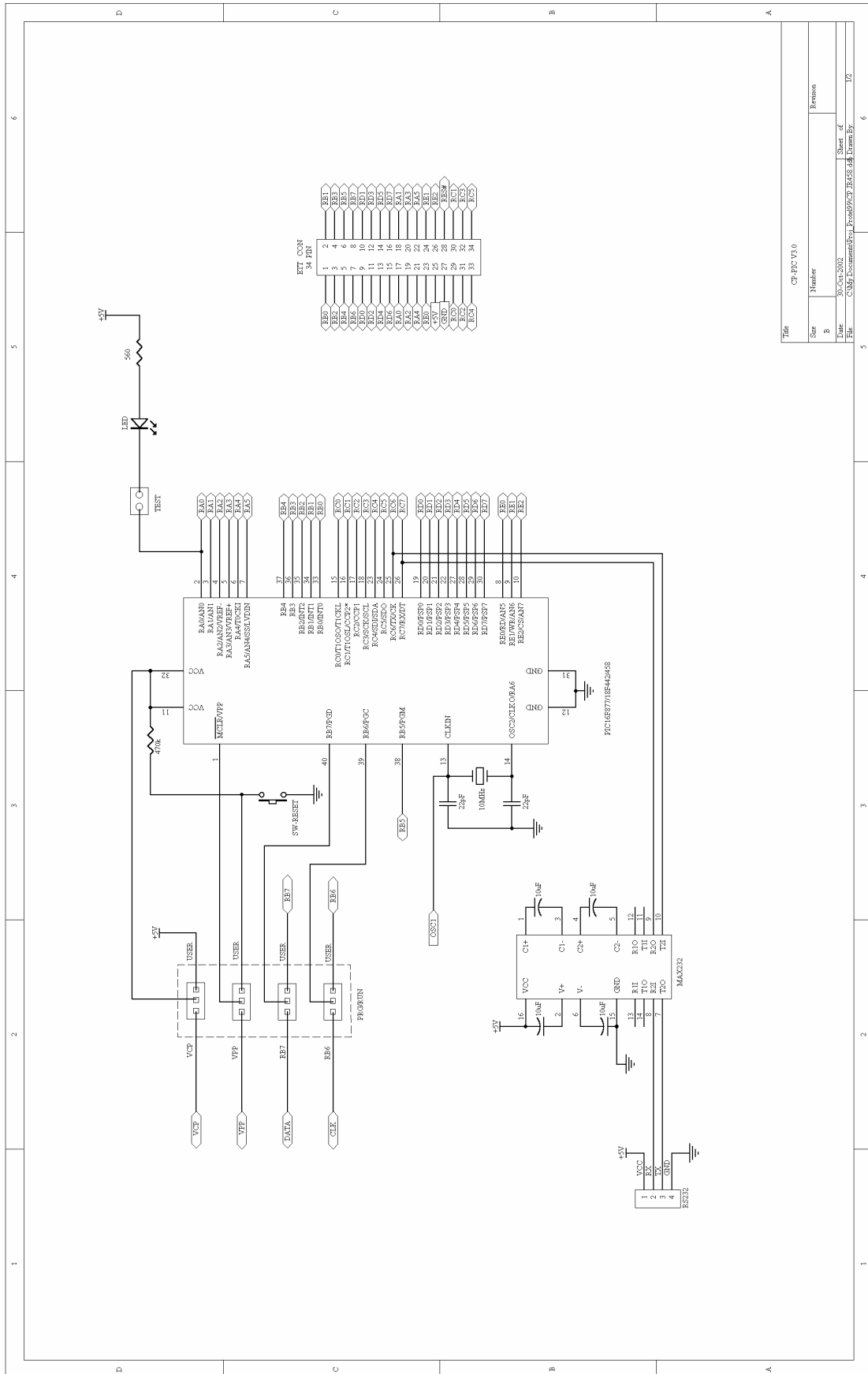
- **HS** is assignment of Clock operation at 10 MHz.
- **HS w/PLL on** is assignment of Clock operation at 40 MHz (For 18F458 Only).

- Download HEX File into FLASH Memory of MCU in board via Menu Instruction **"Device → Program All"** or click Button instruction . After finished completely and there's no mistake, it will display as in the picture.

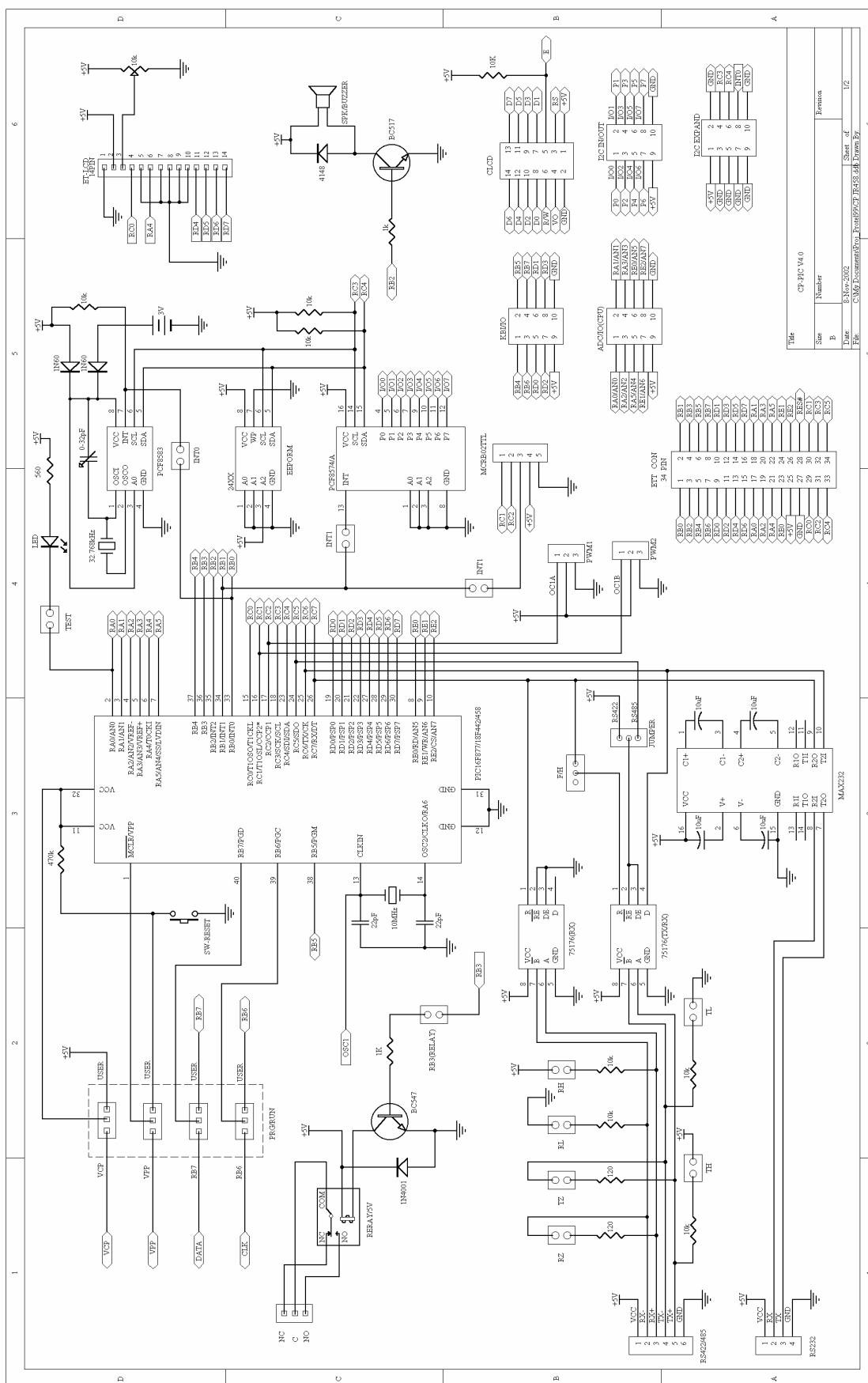


After programming completely, user need to move position of Switch RUN/PROG into Run position for MCU can run as instructions that is designed.





Picture displays circuit of Board CP-PIC V3.0



Picture displays circuit of Board CP-PIC V4.0

