

4.0 Voltage requirements

At the beginning of the programming operation (or any other operation such as reading from device, device verify, erase, etc.), the programmer measures the level of Vcc from the user circuit via the Vcc pin. The programmer compares this measured value with an arbitrary value of 1.0v, and determines if the user circuit is supplying Vcc or not.

Source of Vcc

If Vcc is less than 1.0v, the programmer assumes user circuit is not supplying Vcc and will then provide Vcc to the user circuit.

If the measured Vcc is more than 1.0v, the programmer assumes user circuit is supplying Vcc and therefore will not provide Vcc to the circuit lest it will create conflicts by supplying an undesirable level of Vcc (e.g. User circuit may have peripheral circuits which cannot tolerate a certain voltage).

When User Supplies Vcc

If the user circuit supplies Vcc, it should supply the proper level of Vcc as required by Microchip programming specs. For the user's convenience, the minimum level of Vcc required is shown in the following table (as MinVcc). Since programming specs change from time to time, the user should always check with Microchip to make sure the right level of Vcc is used instead of depending on the following table.

When Programmer Supplies Vcc

For non-LF and non-LC devices (e.g. 16F870, 17C752), the programmer supplies 5v via the 10-pin connector to the user circuit.

For LF and LC devices (e.g. 16LF870, 17LC752), the programmer supplies either 3.3v or 5v to the user circuit. Some LF or LC devices can be programmed at low voltages of Vcc whereas others cannot. If the device can use 3.3v, the programmer supplies 3.3v, otherwise it supplies 5v.

In either case, the software will display the voltage being supplied so that the user always knows what is being used.

Verification Voltages, Vcc Low and Vcc High

According to Microchip programming specs, a production programmer (versus a prototype programmer) needs to verify the device at Vcc Low and Vcc High after programming. These are the low and high operating limits of the device as specified in the Microchip data sheets.

At device selection time, the software automatically sets the Vcc Low and Vcc High values.

For non-LF and non-LC devices (e.g. 16F870, 17C752), the typical values are 2v to 3v for Vcc Low and 5.5v for Vcc High. If these values are not acceptable to the user circuit, the user can change them via the **Configure ISP Options** menu in the Captain software.

	Vcc		Vpp		
If user selects	If user supplies Vcc and Vcc is: 4.5v <= Vcc <= 5.5v	2.2v <= Vcc <= 4.5v	If user does NOT supply Vcc:	Low Vpp Option supported by device: (Note 2)	Notes about TST (pin 6 of the 10-pin connector):
16F870-877 (MinVcc=2.2v)	Erase operation allowed	Erase operation NOT allowed (Note 1)	Programmer supplies Vcc=5v	Yes	If using Low Vpp Option, user needs to connect RB3 to TST .
16LF870-877 (MinVcc=2.2v)	Erase operation allowed	Erase operation NOT allowed (Note 1)	Programmer supplies Vcc=3.3v	Yes	If using Low Vpp Option, user needs to connect RB3 to TST .

If user selects	If user supplies Vcc:	If user does NOT supply Vcc:	Notes	
16F627-628 (MinVcc=4.5v)	Programmer does not supply Vcc.	Programmer supplies Vcc=5v	Yes	If using Low Vpp Option, user needs to connect RB3 to TST .
16LF627-628 (MinVcc=4.5v)	Programmer does not supply Vcc.	Programmer supplies Vcc=5v.	Yes	If using Low Vpp Option, user needs to connect RB3 to TST .
16F73-77 (MinVcc=4.75v)	Programmer does not supply Vcc.	Programmer supplies Vcc=5v	No	
16LF73-77 (MinVcc=4.75v)	Programmer does not supply Vcc.	Programmer supplies Vcc=5v	No	
17C752-766 (MinVcc=3.0v)	Programmer does not supply Vcc.	Programmer supplies Vcc=5v	No	User needs to connect the TEST pin of the device (e.g. pin 17 if device is in PLCC pkg) to TST . Programmer supplies high voltage to Vpp pin and TST pin of 10-pin connector. (Note 3)
17LC752-766 (MinVcc=3.0v)	Programmer does not supply Vcc.	Programmer supplies Vcc=3.3v	No	Same as above.

Note 1: **Bulk** erase operation not supported by device if programming Vcc is less than 4.5v. This means the **/PR** command in DOS, or the **PROM Erase** in Captain are not allowed. During programming, **each word** in the device will be erased when it is being programmed. If device is secured, it cannot be erased and further programming will not be possible using Vcc of less than 4.5v.

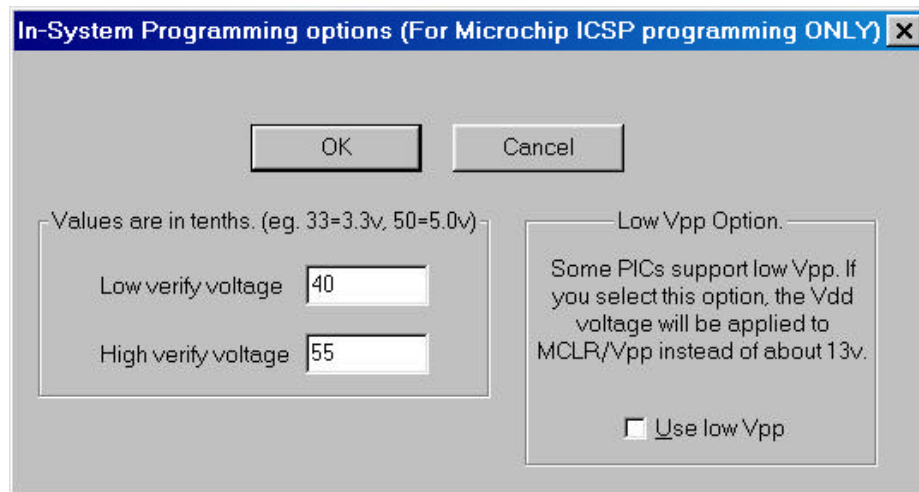
Note 2: The Low Vpp Option is defaulted to be **DISABLED** (ie. not used by user) at device selection time. If the user desires to use the Low Vpp Option, it can be changed by clicking the **Configure ISP Options** menu under Captain.

Note 3: These devices need high voltages for both Vpp and TEST. Ref: Microchip programming spec.

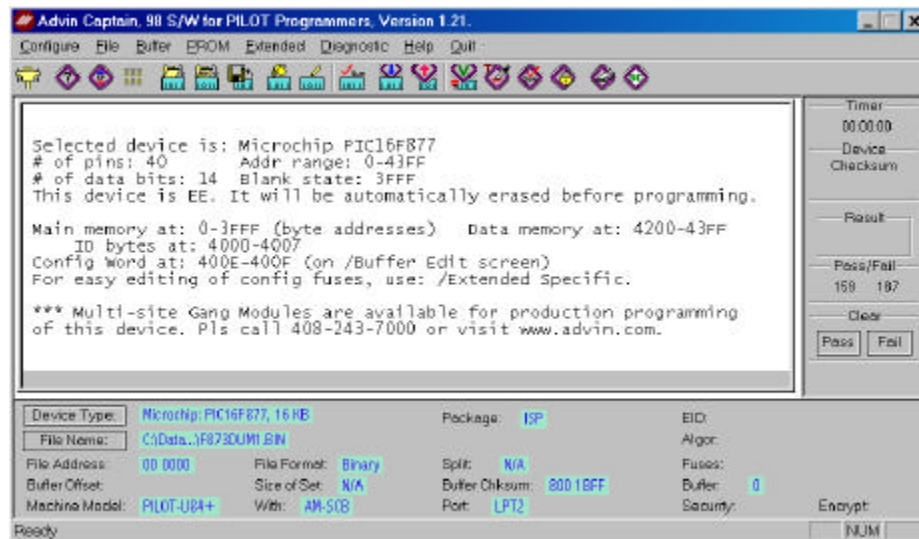
This table and actions of the software are subject to change at anytime without notice to users.

5.0 Software

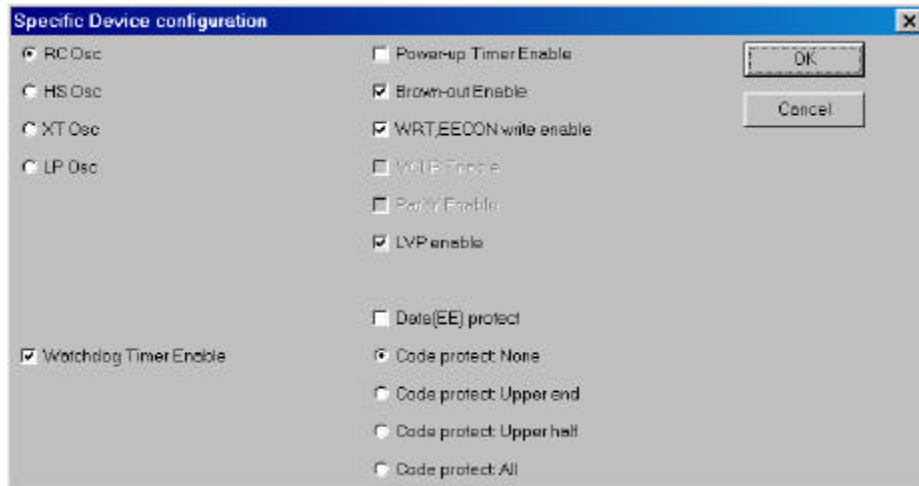
Either the DOS software or the Windows based Captain software can be used. However, the following **Configure ISP Options** screen only exists in Captain..



Here is a screen example of Captain:



The **Specific Device Configuration** screen can be used to easily select the many configuration choices of Microchip PICs:



This document revision corresponds to DOS S/W spUP version 10.96C and Windows S/W Captain version 1.21. Current software can be downloaded at no charge from our website at www.advin.com.