PICmicro Devices

The compiler supports most of the PICmicro range of devices, and takes full advantage of their various features e.g. The A/D converter in the 16F87x series, the data memory eeprom area in the16F84, the hardware multiply present on the 16-bit core devices etc.

This manual is not intended to give you details about PICmicro devices, therefore, for further information visit the Microchip website at **www.microchip.com**, and download the multitude of datasheets and application notes available.

Limited 12-bit Device Compatibility.

The 12-bit core PICmicro microcontrollers have been available for a long time, and are at the heart of many excellent, and complex projects. However, with their limited architecture, they were never intended to be used for high level languages such as BASIC. Some of these limits include only a two-level hardware stack and small amounts of general purpose RAM memory. The code page size is also small at 512 bytes. There is also a limitation that calls and computed jumps can only be made to the first half (256 words) of any code page. Therefore, these limitations have made it necessary to eliminate some compiler commands and modify the operation of others.

While many useful programs can be written for the 12-bit core PICmicros using the PROTON+ Compiler, there will be some applications that are not suited to these devices. Choosing a 14-bit core device with more resources will, in most instances, be the best solution.

Commands that are not supported for the 12-bit core PICmicros are illustrated in the table below: -

Command	Reason for omission
DWORDs	Memory limitations
FLOATS	Memory limitations
ADIN	No internal ADCs
CDATA	No write modify feature
CLS	Limited stack size
CREAD	No write modify feature
CURSOR	Limited stack size
CWRITE	No write modify feature
DATA	Page size limitations
DTMFOUT	Limited stack size
EDATA	No on-board EEPROM
EREAD	No on-board EEPROM
EWRITE	No on-board EEPROM
FREQOUT	Limited stack size
LCDREAD	No graphic LCD support
LCDWRITE	No graphic LCD support
HPWM	No 12-bit MSSP modules

HRSIN	No hardware serial port
HRSOUT	No hardware serial port
HSERIN	No hardware serial port
HSEROUT	No hardware serial port
INTERRUPTS	No Interrupts
PIXEL	No graphic LCD support
PLOT	No graphic LCD support
READ	Page size limitations
RESTORE	Limited memory
SEROUT	Limited memory
SERIN	Limited memory
UNPLOT	No graphic LCD support
USBIN	No 12-bit USB devices
USBOUT	No 12-bit USB devices
XIN	Limited stack size
XOUT	Limited stack size

Trying to use any of the above commands with 12-bit core devices will result in the compiler producing numerous SYNTAX errors. If any of these commands are a necessity, then choose a comparable 14-bit core device.

The available commands that have had their operation modified are: -

PRINT, **RSOUT**, **BUSIN**, **BUSOUT**

Most of the modifiers are not supported for these commands because of memory and stack size limitations, this includes the AT , and the STR modifier. However, the @, DEC and DEC3 modifiers are still available.

Programming Considerations for 12-bit Devices.

Because of the limited architecture of the 12-bit core PICmicro microcontrollers, programs compiled for them by PROTON+ will be larger and slower than programs compiled for the 14-bit core devices.

The two main programming limitations that will most likely occur are running out of RAM memory for variables, and running past the first 256 word limit for the library routines.

Even though the compiler arranges its internal SYSTEM variables more intuitively than previous versions, it still needs to create temporary variables for complex expressions etc. It also needs to allocate extra RAM for use as a SOFTWARE-STACK so that the BASIC program is still able to nest GOSUBs up to 4 levels deep.

Some PICmicro devices only have 25 bytes of RAM so there is very little space for user variables on those devices. Therefore, use variables sparingly, and always use the appropriately sized variable for a specific task. i.e. **BYTE** variable if 0-255 is required, **WORD** variable if 0-65535 required, **BIT** variables if a true or false

situation is required. Try to alias any commonly used variables, such as loops or temporary stores etc.

As was mentioned earlier, 12-bit core PICmicro microcontrollers can call only into the first half (256 words) of a code page. Since the compiler's library routines are all accessed by calls, they must reside entirely in the first 256 words of the PICmicro code space. Many library routines, such as BUSIN, are quite large. It may only take a few routines to outgrow the first 256 words of code space. There is no work around for this, and if it is necessary to use more library routines that will fit into the first half of the first code page, it will be necessary to move to a 14-bit core PICmicro instead of the 12-bit core device.

No 32-bit variable support for 12-bit devices.
Because of the profound lack of RAM space available on most 12-bit core devices, the compiler does not allow 32-bit **DWORD** type variables to be used. For 32-bit support, use on of the many 14, or 16-bit core equivalent devices.

Floating point variables are also not supported with 12-bit core devices.

Compatible 12-bit Devices.

12C508
12C509
12CE508
12CE509
RF509AF
RF509AG
16C54
16C55
16C57
16C58

All the above devices have derivatives such as the 16C54B etc. These are also catered for by the compiler.

Supported devices

12-bit core
12C508, 12C509, 12C508A, 12C509A, 12CE518, 12CE519, 16C54, 16C54A, 16C54B
16C55, 16C55A, 16C56, 16C56A, 16CR56, 16C57, 16C57C, 16CR57A, 16CR57B
16C58,16C58A, 16CR58A, , 16CR58B, 16CR58C, RF509AF,RF509AG

14-bit core
12C671, 12C672, 12CE673, 12CE674, 16C61, 16C62, 16C62A, 16C62B
16C63, 16C63A, 16C64, 16C64A, 16C65, 16C65A, 16C65B, 16C66, 16C67
16C71, 16C71A, 16C72, 16C72A, 16C73, 16C73A, 16C73B, 16C73C, 16C74

16C74A, 16C76, 16C77, 16C554, 16C554A, 16C558, 16C558A, 16C641
16C642, 16C661, 16C662, 16C710, 16C711, 16C712, 16C715, 16C716
16C745, 16C765, 16C770, 16C771

14-bit core FLASH

12F675, 12F629, 16F630, 16C84, 16CR84, 16F72, 16F73, 16F74, 16F76,
16F77,16F83, 16F84, 16F84A
16F627, 16F628, 16F627A, 16F628A, 16F648A, 16F676, 16F818, 16F819,
16F870, 16F871, 16F872
16F873, 16F873A, 16F874, 16F874A, 16F876, 16F876A, 16F877, 16F877A

16-bit core

18C242, 18C252, 18C442, 18C452, 18C658, 18C858

16-bit FLASH

18F1220, 18F1230, 18F2220, 18F2320, 18F4220, 18F4320, 18F242, 18F248,
18F252, 18F258
18F442, 18F448, 18F452, 18F458, 18F6620, 18F6720, 18F8620, 18F8720

See also : DEVICE .