Chapter 2. Language Specifics

2.1 DATA TYPES AND LIMITS

2.1.1 Integer Types

The MPLAB C18 compiler supports the standard ANSI-defined integer types. The ranges of the standard integer types are documented in Table 2-1. In addition, MPLAB C18 supports a 24-bit integer type `short long int` (or `long short int`), in both a signed and unsigned variety. The ranges of this type are also documented in Table 2-1.

TABLE 2-1: INTEGER DATA TYPE SIZES AND LIMITS

Type	Size	Minimum	Maximum
`char`(1,2)	8 bits	-128	127
`signed char`	8 bits	-128	127
`unsigned char`	8 bits	0	255
`int`	16 bits	-32,768	32,767
`unsigned int`	16 bits	0	65,535
`short`	16 bits	-32,768	32,767
`unsigned short`	16 bits	0	65,535
`short long`	24 bits	-8,388,608	8,388,607
`unsigned short long`	24 bits	0	16,777,215
`long`	32 bits	-2,147,483,648	2,147,483,647
`unsigned long`	32 bits	0	4,294,967,295

Note 1: A plain *`char`* is signed by default.

2: A plain *`char`* may be unsigned by default via the `-k` command-line option.

2.1.2 Floating-point Types

32-bit floating-point types are native to MPLAB C18 using either the `double` or `float` data types. MPLAB C18 utilizes the IEEE-754 floating-point standard to represent floating-point types. The ranges of the floating-point type are documented in Table 2-2.

TABLE 2-2: FLOATING-POINT DATA TYPE SIZES AND LIMITS

Type	Size	Minimum Exponent	Maximum Exponent	Minimum Normalized	Maximum Normalized
`float`	32 bits	-126	128	$2^{-126} \approx$ 1.17549435e - 38	$2^{128} * (2-2^{-15}) \approx$ 6.80564693e + 38
`double`	32 bits	-126	128	$2^{-126} \approx$ 1.17549435e - 38	$2^{128} * (2-2^{-15}) \approx$ 6.80564693e + 38