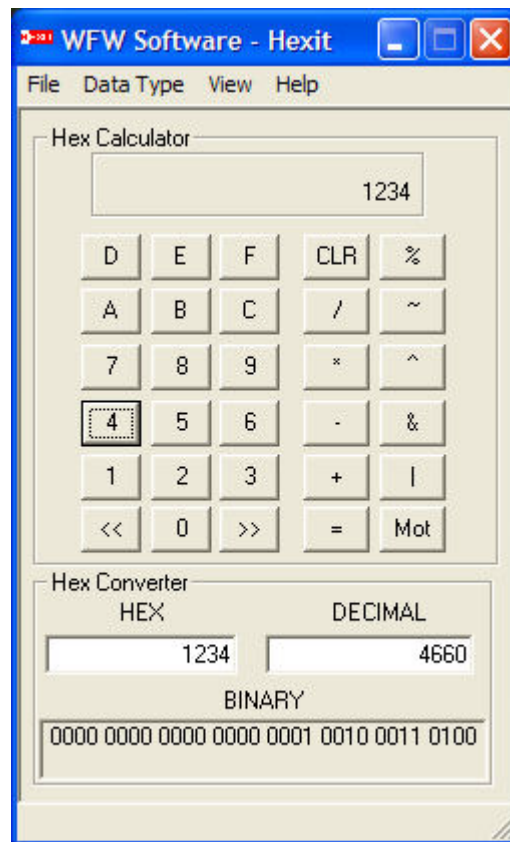**Hexit**
Hexadecimal Calculator and Converter
User Manual

Version 1.5

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Warranty Information

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Evaluation and Registration

Hexit is a freeware product. No registration is required.

Distribution

Hexit can be distributed freely.

This program is produced by a member of the Association of Shareware Professionals (ASP). ASP wants to make sure that the shareware principle works for you. If you are unable to resolve a shareware-related problem with an ASP member by contacting the member directly, ASP may be able to help. The ASP Ombudsman can help you resolve a dispute or technical problem with an ASP member, but does not provide technical support for members' products. Please contact the ASP Ombudsman online at http://www.asp-shareware.com/omb.

1 Overview

Hexit supports standard C programming language data types. The default setting is unsigned long. The data types include the following.
- character and unsigned character (char and unsigned char)
- integer and unsigned integer (int and unsigned int)
- long integer and unsigned long integer (long and unsigned long)
- float and double (converter only)

Hexit includes four displays including
- hexadecimal (hex) calculator display
- hex format display
- decimal format display
- binary format display

Figure 1-1 shows the *Hex Calculator*. The *Hex Calculator* button grouping includes hexadecimal numeric buttons, basic arithmetic and logical operators.   The *Hex Converter* grouping includes two edit displays, *HEX* and *DECIMAL*, which accept keyboard inputs to perform conversions. The third display, *BINARY* is used to show the binary equivalent of the current hexadecimal or decimal number. Data types can be selected using the *Data Type* menu item.
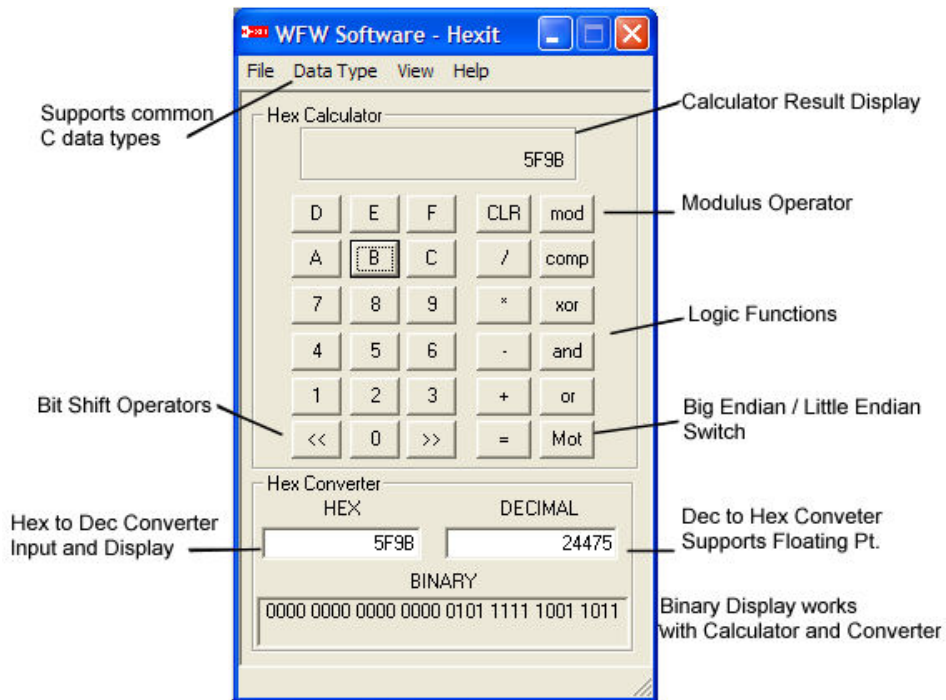
Figure 1-1 **Hexit** Features

The *Hex Calculator* supports the following arithmetic and logical operators.

- CLR   clears displays and resets calculator
- /   division operator
- *   multiplication operator
- -   subtraction operator
- +   addition operator
- =   equal operator
- %   modulus operator (remainder from division)
- ~   complement logic operator
- ^   bitwise exclusive OR (XOR) logic operator
- &   bitwise AND logic operator
- | bitwise OR logic operator
- >>   shift right logic operator
- <<   shift left logic operator
- Mot   Mot-Int byte order format (Motorola or Big Endian, Intel or Little Endian)

The **Hexit** has a *Help Instructions* menu item listed under the *Help* menu item on the main menu. *Help Instructions* opens a help dialog box to describe button functions and groupings.

1.1 Hex Calculator Operation

1.1.1 Arithmetic and Logic Calculations

Hexit performs simple arithmetic and logic calculations. It does not support order of precedence so all calculations are performed in the order in which they are input. The general input sequence is *first number -> operation -> second number -> operation …*

The three periods (…) at the end of the sequence above indicates that the sequence can continue indefinitely. For example to add together 12_h + $A6_h$ = $B8_h$ use the following button sequence.

Figure 1-2 shows the **Hexit** hexadecimal, decimal, and binary results. All four **Hexit** displays support the calculator function. Note that the *Hex Converter* display hex and binary values are zero justified based on the number of digits required to complete the data type.
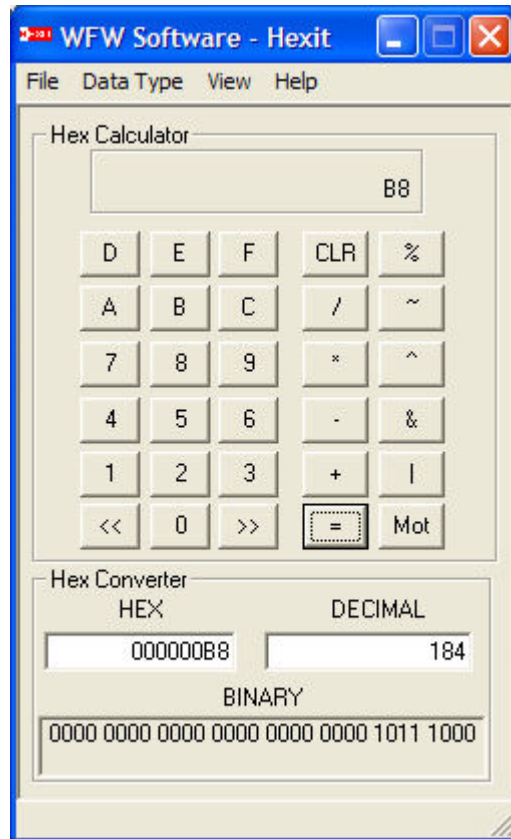
Figure 1-2 **Hexit** Addition Operation Result

1.1.2 The Complement Operator

The complement operator (~) does not take a second argument it merely takes the complement of the argument in the *Hex Calculator* display. Continuous pressing of this operator toggles the display between the argument and its complement.

1.1.3 Logic Operators

To perform a logical AND, OR, XOR, modulus, or shift operation use the same process as for the arithmetic operation shown previously. For example, to find the result of 12_h XOR $A6_h$ = $B4_h$, use the following sequence. Figure 1-4 shows the result of the XOR operation.
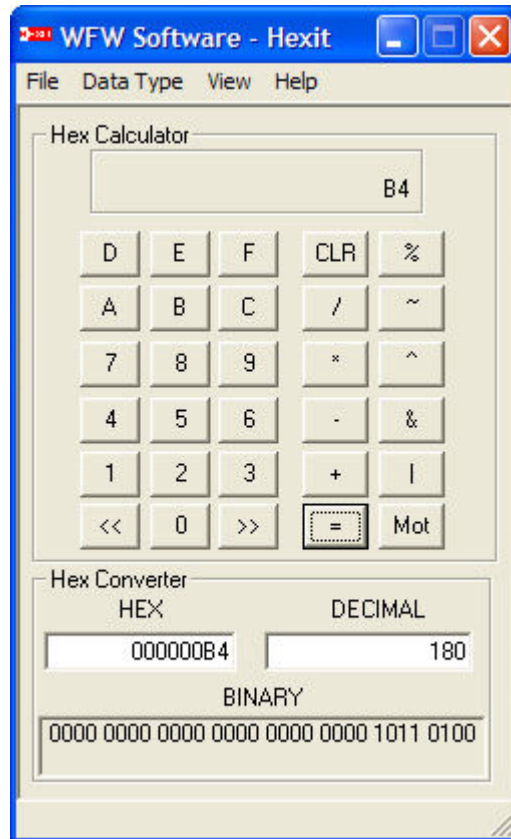
Figure 1-3 Results of 12_h XOR $A6_h$

The shift operators, shift right (>>) and shift left (<<) require two arguments; the number to be shifted and the number of places to shift. For example, to shift a 1_h four places to the left which equals 10_h or 16_d, use the following button sequence.

Shift Operator Rules:

- The results of a shift operation is undefined if the second argument is greater than or equal to the number of bits of the first argument.
- The value of a shift right expression 1st argument >> 2nd argument is

    1st argument $/ 2^{\text{2nd argument}}$

- The value of a left shift expression 1st argument << 2nd argument is

    1st argument $\times 2^{\text{2nd argument}}$

- Bits vacated by the shift operation are zero-filled for unsigned arguments.

- For signed arguments, the sign bit is propagated into the vacated bit positions. The shift is a logical shift if the 1st argument is an unsigned data type. Signed data types result in an arithmetic shift.

1.2 Hex Converter Operation

The *Hex Converter* takes inputs from the keyboard whenever a conversion is desired. The *HEX*, *DECIMAL*, and *BINARY* displays support the calculator functions when the calculator is being used. To perform a conversion, an argument must be input into either the *HEX* display or the *DECIMAL* display, depending on the number base conversion desired. The *BINARY* display does not accept inputs and is a read-only display.

To input a number into either the *HEX* or the *DECIMAL* displays there must be a cursor active in the display. This can be accomplished by clicking on the desired display with the mouse cursor or by tabbing through the **Hexit** buttons using the tab key on the keyboard. Once the display has a cursor blinking in it, i.e., it is the active display, the desired number can be typed in for conversion. **Hexit** converts and updates the displays as each digit is input (case does not matter for hexadecimal digits between A and F). Decimal points are ignored unless the float or double data type is selected and the *DECIMAL* display is the active display receiving input.

1.2.1 Converting a Decimal Number
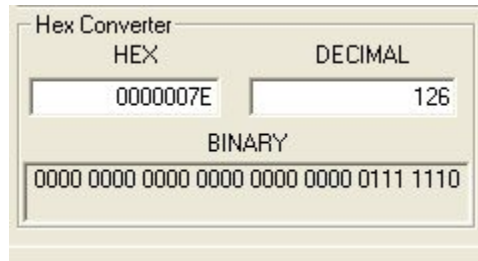
To convert a decimal number to both hexadecimal and binary, type the number into the *DECIMAL* display. For example to convert 126_d to hexadecimal and binary format, type the following into the *DECIMAL* display as shown in Figure 6-4. The *HEX* and *BINARY* displays are updated with each digit input.
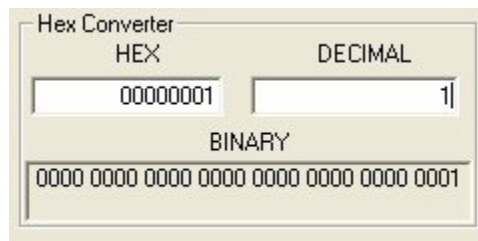
A. 1 digit input of 126_d
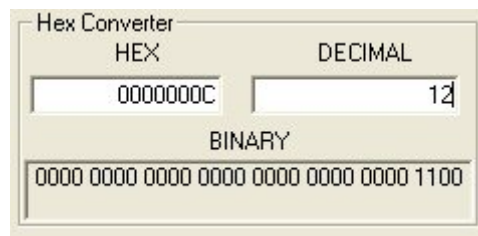
B. 2nd digit is input of 126_d

C. 3rd digit is input of 126_d

Figure 1-4 Conversion of 126_d

1.2.2 Converting a Floating Point Number

To convert a floating point number the data type must be set to either float or double. Select either *float* or *double* in the *Data Types* grouping. Then input the number into the *DECIMAL* display. The byte order for the floating point number will depend on the setting of the **Mot** button. This is because **Hexit** reads the floating point format of the number out of the computer's memory. Figure 6-5 shows this operation with the button set in *Mot* mode (Motorola or Big Endian byte order). Figure 6-6 shows the same operation when *Mot* is toggled to *Int* mode (Intel or Little Endian order).
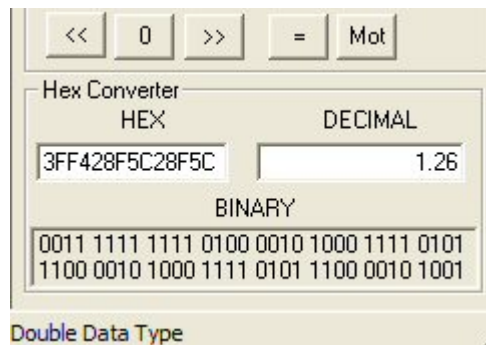

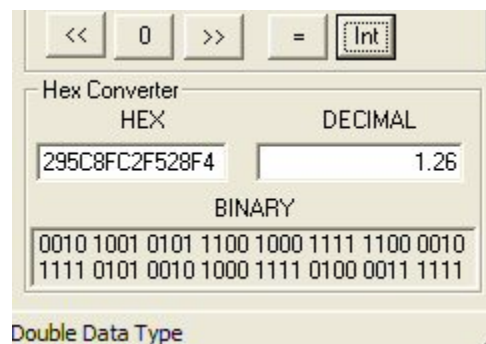Figure 1-5 Double Format Conversion in Mot Mode

Figure 6-6 Double Format Conversion in Int Mode

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1.2.3 Converting a Hexadecimal Number

There are two ways to convert a Hexadecimal number to decimal and binary format. The first way is to input the number into the **Hexit** *HEX Calculator*. The *HEX Converter* automatically converts all numbers shown in the **Hexit** HEX Calculator Display. The second way is to type a hexadecimal number into the **Hexit** *HEX Converter's* display.

1.3 Hexit and Negative Numbers

The following two rules apply to dealing with negative numbers when using **Hexit**.

- **Hexit** *Hex Calculator* performs bitwise operations the same for signed integers and unsigned integers.
- Signed integers are always input in hexadecimal format (two's-complement form). Note there is no change sign button on the *HEX Calculator*. To input a negative number the number must be input in its hexadecimal format. Use the *HEX Converter* to get the hexadecimal format for a negative decimal number. Remember to set the data type to a signed type (char, int, or long) when calculating with negative numbers.

2 Menu Items

Figure 2-1 shows the **Hexit** main menu which includes settings for *Data Type*, *View*, and Help.
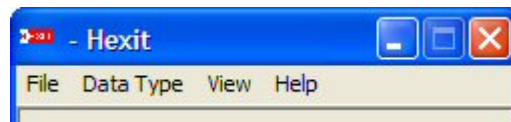

Figure 2-1 **Hexit** Menu Items

2.1 Data Type

Figure 2-2 shows the settings for *Data Type*. Highlighted is the *Integral Types*; unsigned character (unsigned char), character (char), unsigned short integer (unsigned short), signed short integer (short), unsigned long integer (unsigned long), and long integer (long).
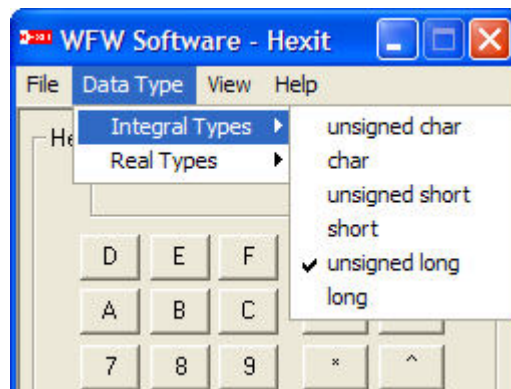
Figure 2-2 Data Type and Integral Data Types

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Figure 2-3 shows the settings for *Real Types* of which there are two; float and double. The real data types are only supported by the *Hex Converter* section of **Hexit**. Attempts to use these types with the Hex Calculator section will result in an error message.
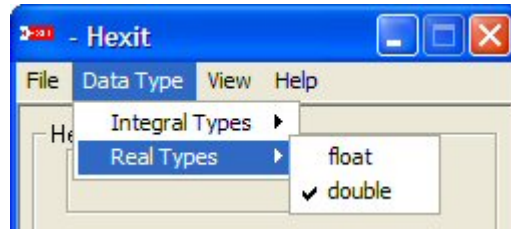
Figure 2-3 Real Types

2.2 View

Figure 2-4 shows the View Menu Items. There are four selections; *Status Bar*, *Remove Border*, *Make Topmost Window, and Use Programmer Symbols.*
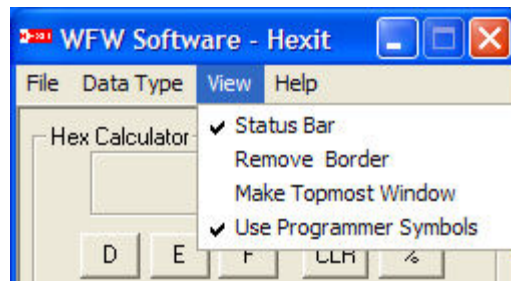
Figure 2-4 View Menu Item

2.2.1 Status Bar

The *Status Bar* menu item is a toggle that enables or removes the status bar at the bottom of the **Hexit** window. It is recommended that this setting be set or enabled so that status messages can be read.

2.2.2 Remove Border

The *Remove Border* menu item is a toggle that enables or removes the window border. This is a user preference only; however, removing the window border requires that the *File* menu item be used to exit the program.

2.2.3 Make Topmost Window

Make Topmost Window is a toggle setting. When it is set, **Hexit** will always be the topmost window on the desktop. This is handy when you need to perform calculations

while working with another program and you want the calculator to stay on top of the other application.

2.2.4 Use Programmer Symbols

Use Programmer Symbols is a toggle setting. When it is set, Hexit will use C-style symbols for logic functions. Examples include **%** for modulus operator and **^** for the exclusive OR operator.   When this setting is disabled Hexit will use name-symbols for logic functions. Examples include **mod** for modulus operator and **xor** for the exclusive OR operator.

2.3 Help

The *Help* menu item includes three selections; *About Hexit*, *Help Instructions*, and *Register Hexit*.   *About Hexit* gives the version number and copyright notice.   *Help Instructions* calls a help dialog panel that gives a brief description of the **Hexit** buttons. The *Help Instructions* panel is shown in Figure 2-5.   *Register Hexit* calls a message panel with information to register **Hexit**.   Although registration is not required, users can register via e-mail to insure that they are notified of future version changes.

```
┌─ Hints and Instructions ──────────────────────────────────┐
│                                                            │
│   Hexit is divided into two functional sections, Hex Calculator and Hex Converter.   │
│                                                            │
│   The Hex Calculator only functions with integral data types such as Short, Long,   │
│   and Chars.  It does not function with Reals such as Floats or Doubles.   │
│                                                            │
│   The Hex Converter can convert between Hex and Decimal or Decimal and Hex   │
│   for all integral types but will only convert from Decimal to Hex for Real types.   │
│                                                            │
│   Button Operations :                                      │
│                                                            │
│     CLR  Clears display to start new calculation           │
│                                                            │
│     %  Modulus operator                                    │
│                                                            │
│     ~ Complement operator                                  │
│                                                            │
│     ^ Exclusive OR operator                                │
│                                                            │
│     & Bitwise AND operator                                 │
│                                                            │
│     | Bitwise OR operator                                  │
│                                                            │
│     << Shift Left operator,  >> Shift Right operator        │
│                                                            │
│     = Equal, displays total or subtotal                    │
│                                                            │
│   Mot/Int switches between Big Endian (Motorola or Raw) data storage format   │
│   and Little Endian (Intel) format.                        │
│                                                            │
└────────────────────────────────────────────────────────────┘
```
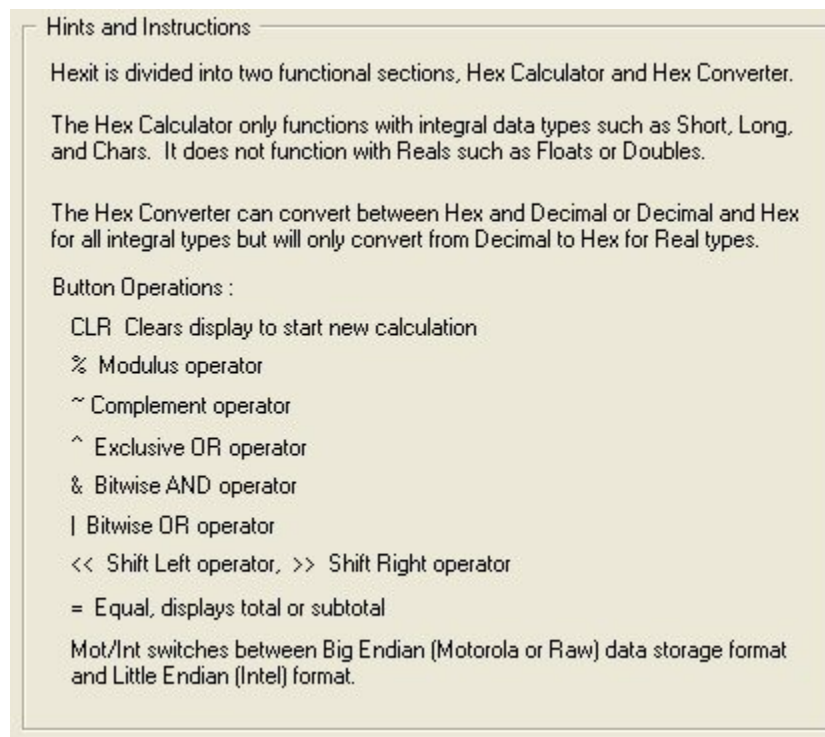
Figure 2-5 Help Instructions

3 Error Messages

Hexit has only one error message to alert the user when an input error occurs. Figure 3-1 shows the error message. This message is displayed whenever a hex calculation is attempted on a real data type.
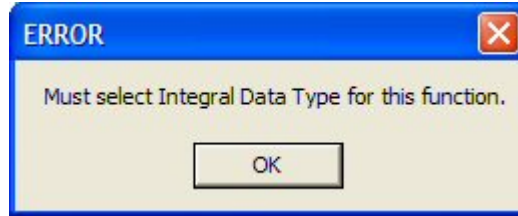
Figure 3-1 Error Message

4 Product Test Information

Hexit has been tested using a variety of test calculations. These test calculations are designed to verify that **Hexit** performs calculations correctly. It is impossible to build a list of test calculation to address every possible combination of functions and calculating conditions that can be encountered and so it is always possible that a calculation error may go undetected in testing. Please submit any calculation errors or problems encountered to WFW Software by sending an email to info@wfwsoftware.com. WFW Software wants to provide the best calculator possible and is interested in suggestions.