

Chapter 8 Binary Subtraction

Lab Using only contacts and coils, subtract one integer number from another integer.

Binary Subtraction

To perform binary subtraction, the easiest method is to find the 2's complement of the second number and then add the two numbers together. To find the 2's complement, invert all the bits (1's complement and add 1).

To find the 2's complement:

number	0	1	0	0	1	1	0	1	0	1	1
1's complement	1	0	1	1	0	0	1	0	1	0	0
+1											1
2's complement	1	0	1	1	0	0	1	0	1	0	1

Then add the 2's complement to the first number.

A second method of finding the 2's complement requires the use of a memory bit. The rule requires that bits from the original number be copied to the 2's complement number starting at the right-most bit. The rule applies until a "1" is encountered. The first "1" is copied but a memory bit is set after which the bits are "flipped". Try this rule. It works and may be employed using ladder logic and a Latch bit to quickly find the 2's complement of a number.

Again, logic must be added to complete the function using rungs similar to rungs 4 and 5 of this figure but using bits 2 through 15.

