

Multiply Example

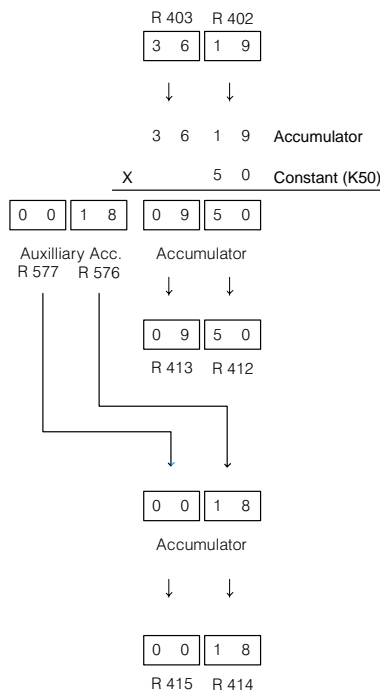
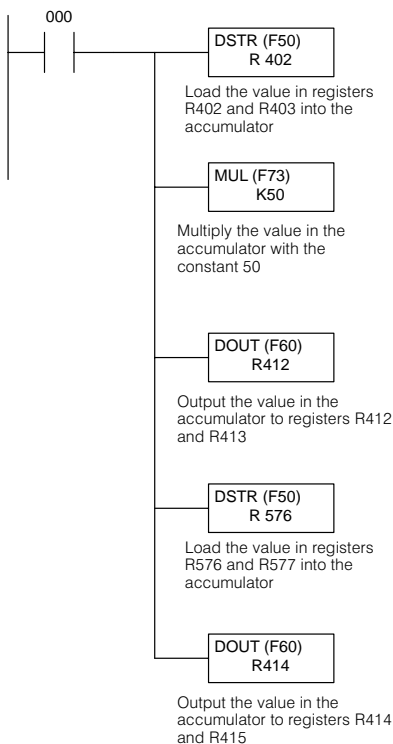
The multiply instruction allows you to multiply two 4-digit numbers together. The result is located in the accumulator and the auxiliary accumulator (R576 and R577) when necessary. The accumulator holds the lower 4 digits of the result and the auxiliary accumulator holds the upper 4 digits.

Whenever possible multiplications resulting in more than 4 digits should be avoided since the DL305 instruction set can only manipulate a maximum of two consecutive 8-bit registers (4 digits) at one time.

If the result of a multiplication is greater than 4 digits, the application program must be written to compensate for the instruction set 4 digit maximum for data manipulation. The example below shows how the auxiliary accumulator is used to store a result with more than 4 digits and how to access the upper 4 digits.

The example below shows how the auxiliary accumulator is used to process numbers larger than 4 digits when the multiplication instruction is used.

DirectSOFT Display



Handheld Programmer Keystrokes

STR	SHF	0	ENT
F	5	0	ENT
R	4	0	2 ENT
F	7	3	ENT
SHF	5	0	ENT
F	6	0	ENT
R	4	1	2 ENT
F	5	0	ENT
R	5	7	6 ENT
F	6	0	ENT
R	4	1	4 ENT

**Divide
DIV (F74)**

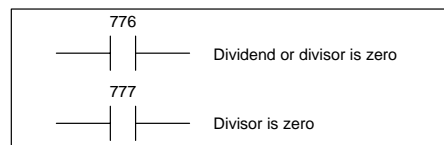
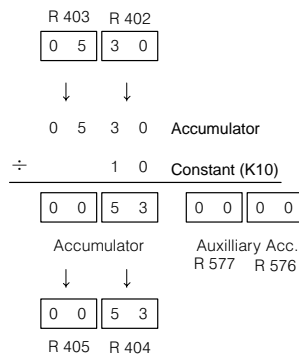
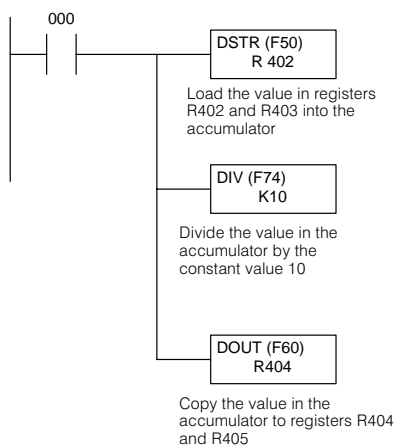
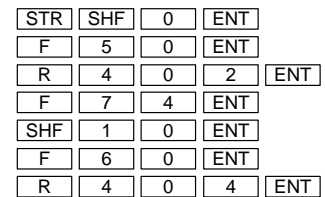
The Divide (F74) is a 16-bit instruction that divides the value in the accumulator by the value in a 16-bit register, two consecutive 8-bit registers, or a 4-digit BCD value. The integer portion of the result is stored in the accumulator and the decimal fraction is stored in the auxiliary accumulator, R576 and R577. Discrete flags are used to indicate if the dividend or divisor is zero or if only the divisor is zero.

DIV (F74)
A aaaa

Data Type		D3–330 Range	D3–340 Range	D3–330P Range
A		aaaa	aaaa	aaaa
Inputs / Outputs	R	000–014 070–075	000–014 070–075	000–014 070–075
Control Relays	R	016–036	016–036 100–105	016, 020–027
Shift Registers	R	040–056	040–056	—
Stages	R	—	—	100–116
Timer /Counters (16 bit)	R	600–677	600–677	600–677
Data Registers	R	400–577	400–577 700–777	400–577
Constant (4-digit BCD)	K	0000–9999	0000–9999	0000–9999

Discrete Bit Flags	Description
776	Will be on if the dividend or divisor is zero
777	Will be on if the divisor is zero

In the following example, when input 000 is on the value (530) in R402 and R403 is loaded into the accumulator using the Data Store (F50) instruction. The data in the accumulator is divided by the constant 10 (K10). The result in the accumulator and is copied to data registers R404 and R405 using the Data Out (F60) instruction. The remainder is in the auxiliary accumulator (R576 and R577).

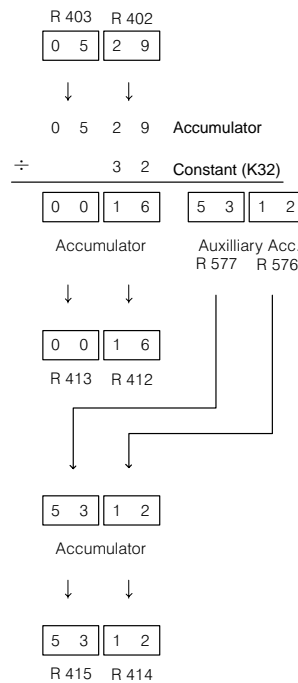
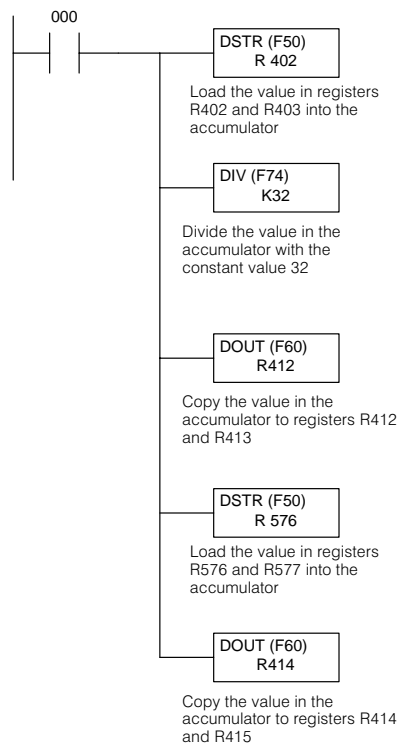
DirectSOFT Display**Handheld Programmer Keystrokes**

Divide Example

The divide instruction allows you to divide the value in the accumulator by 4 digits maximum. The divide instruction uses the accumulator for the integer value of the result and the auxiliary accumulator (R576 and R577) for fraction. The instruction set only allows manipulation on two consecutive registers at a time. For example, if the result was a 4 digit number with a remainder it would have to be treated like two 4-digit numbers in the program. Manipulating numbers over 4 digits should be avoided whenever possible. If it cannot be avoided the application program must be written to compensate for the 4-digit maximum for data manipulation.

The example below shows how the auxiliary accumulator is used to store the fractional portion of the result and how to access the remainder.

DirectSOFT Display



Handheld Programmer Keystrokes

STR	SHF	0	ENT
F	5	0	ENT
R	4	0	2 ENT
F	7	4	ENT
SHF	3	2	ENT
F	6	0	ENT
R	4	1	2 ENT
F	5	0	ENT
R	5	7	6 ENT
F	6	0	ENT
R	4	1	4 ENT